

InfoWorld looks at five database products with a range of strengths to link and manipulate your data. See Page 55

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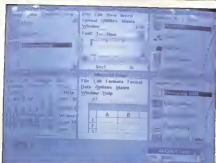
IBM Shows Off Faster, 'Light' OS/2 Version

BY ED SCANNELL
AND STUART JOHNSTON

NEW YORK — In the wake of Microsoft Corp.'s massive marketing campaign for Windows 3.0, IBM did a little drum beating of its own last week showing off a faster, lighter version of OS/2 it hopes will pull the sluggish operating system out of the doldrums.

Microsoft officials, however, seemed less enthusiastic about the upcoming release, indicating that they feel it isn't what users want or need. This signals a major difference of opinion between the two joint developers of OS/2, who both endorsed the previous 1.1 November.

Shown as part of a series of demonstrations on unreleased



IBM demonstrated a faster, lighter version of OS/2 — requiring only half the memory as previous versions — at PC Expo last week.

products here, OS/2 Standard Edition 1.X, which incorporates Adobe Type Manager, is capable of running with just 2 megabytes of memory, or about half what is required of previous

versions. It also runs applications between 5 and 10 percent faster, according to Lei Reewig, IBM's director of software strategy.

See IBM, Page 89

Microsoft Set to Unleash Raft of Network Products

BY STUART J. JOHNSTON

Microsoft is hoping to build enthusiasm for its networking strategy by shipping four major systems products this summer.

The Redmond, Washington-based software giant will ship LAN Manager 2.0, OS/2 1.21, SQL Server 1.1, and Comm Server this summer, according to Paul Maritz, Microsoft vice president of advanced operating

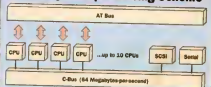
systems.

The company will begin by shipping a version of OS/2 1.21 to hardware vendors in the next two weeks, who in turn will probably release it to end-users in July, Maritz says.

OS/2 1.21 will be the first release for non-IBM machines that gives users the 16-bit High Performance File System (HPFS). It also improves the

See Microsoft, Page 89

Corollary Multiprocessing Scheme



Corollary uses a single CPU to communicate with the AT bus.

NEWS ANALYSIS

Multiprocessing PC LAN Servers Sound Great, But Need Software

BY MARTIN MARSHALL

On the surface, the prospect of using multiprocessing systems as PC LAN servers looks enticing. Gang- ing together multiple Intel 386 and 486 processors can only drive up the MIPS count, the

reasoning goes, potentially resulting in whiz-bang performance as a LAN server.

But aside from Unix-related implementations such as Banyan's Vines and AT&T's LAN Manager/X, traditional PC LAN software such as Novell

See Servers, Page 82

X&A Demos Ventura for Windows, OS/2

BY ED FOSTER

NEW YORK — Ventura Software demonstrated the Windows and OS/2 versions of its Ventura Publisher 3.0 Gold Series at PC Expo here last week. The company also announced it

is shipping a new GEM version of the Gold Series program.

All three versions of the desktop publishing program provide the same basic feature set, but the Windows and OS/2 version will take advantage of additional capabilities provided

by those environments, Ventura officials said.

The Windows Edition of the Gold Series, which is expected to ship early in the third quarter, was rewritten to be a true Windows product, according to Anne Galdos, Ventura Publisher product marketing manager.

The Windows version will use standard Windows drivers for printers and other peripherals. "We are relying wholly on the (Windows) environment for drivers because we wanted to make a true Windows product," Galdos said.

See Ventura, Page 89

Feature	High	Med	Low
Text	Yes	Yes	Yes
Graphics	Yes	Yes	Yes
Table	Yes	Yes	Yes

Ventura Publisher 3.0 Gold Series for Windows will rely on the device drivers in Windows instead of providing its own.

THIS WEEK



PERSPECTIVES. Software publishers are learning that they must adapt to foreign cultures to sell their products overseas.

REVIEWS. Postmaster is an easy and basic E-mail package; Star America 386SX-16 boosts its 16-MHz chip to 20 MHz.

Standardizing Upgrade Policies Will Be a Big Challenge for PC Managers

BY ALICE LAPLANTE

Now that a consistent, graphical interface is available for applications running on virtually all PC hardware platforms, PC managers say an even bigger challenge lies ahead: standardizing a consistent way of managing software upgrades.

"As long as PCs have been around, it's been a horror," said Phyllis Koch, systems manager for Ryder System Inc., in Miami.



"Even with software licenses, upgrades are a tremendous headache," said Cheryl Currid, director of applied information technology at Coca-Cola Foods, in Houston, speaking at spring

See Upgrade, Page 82

New FoxPro

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A Higher Standard in Relational Databases.**

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Laserwriter motherboards are reborn in Don Thompson's homemade versions. **21**



Xtreme's split-screen window lets users compare two directories. **31**



The Radius TV is a Mac II digitizer and frame grabber with a built-in cable-ready tuner. **37**

AT DEADLINE

XDB Update Will Let DB2 Applications Run on PCs

Organizations wishing to downscale mainframe-based DB2 applications to run on PCs will have available next month the first PC DBMS to mimic DB2 referential integrity. XDB Systems Inc., of College Park, Maryland, demonstrated the DOS-based XDB, Version 2.4, due out in July, at its user conference in Virginia last week.

XDB also said its XDB-Server for OS/2 will ship in the third quarter, and its XDB-Server NLM for Netware 386 will ship in the fourth quarter. Also shown were a Windows 3.0 XDB database engine, revised Crib Workbench, and C compiler. Due in the third quarter.

XDB-Link, cooperative processing between XDB on the PC and mainframe DB2; and XDB/Image, a companion image management system will ship in the fourth quarter.

— Scott Macvic

NEWS

Apple is working with third-party developers to formalize a cross-platform set of standards. called Quicktime, to secure leadership of the multimedia market. **5**

3Com demonstrates its commitment to systems integration by announcing software connecting 3+Open LAN manager workstations to other network servers, including Netware. **6**

Big Blue adds its voice to the chorus of PC network vendors touting multivendor networking and open standards with its announcement of several internetworking enhancements. **6**

Beta testing of the DOS Paradox Data Lens Driver for Paradox Tables, linking 1-2-3-3.0 and the Rdb database for VAX, has begun. **6**

Ingres is scheduled to announce CL/I connectivity for Mac applications and its RDBMS for VAX VMS systems. **6**

Study shows that 286- and 386-based systems still dominate the market. **6**

Computers can "read" run-on hand-printed characters in real time with software developed by IBM. **6**

Microsoft announces a shrink-wrapped edition of Windows 3.0 Software Developer's Kit (SDK) and a 32-bit version of C 6.0. **6**

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Micrograph's Charisma brings together word, chart, business graphics, and desktop publishing capabilities. **13**

Informix releases OS/2 and Windows versions of its Wingz spreadsheet in one package. **12**

HARDWARE

A BIS CA survey reveals strong interest in multifunctional peripherals. **21**

Texas Instruments unveils a 4.4-pound 286-based laptop at PC Expo. **21**

NETWORKING

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Xtreme for Netware offers peer-to-peer communication and an archive command that compresses files in the ARC format. **31**

INFO WORLD

MACINTOSH NEWS

Radius plans to announce a color TV display system with a built-in cable-ready tuner that offers users a tool for producing multimedia presentations. **37**

UNIX NEWS

Hewlett-Packard introduces workstations that run either HP-UX or Domain OS. **38**

INDUSTRY

An accord signed by the Soviet Union and a U.S. testing lab will ensure the viability of imported Soviet software on domestic platforms. **39**

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PRODUCT COMPARISON

We look at five multifile relational databases designed to let you link and manipulate your data. **56**

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COLUMNS

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NEXT WEEK

REVIEWS. The Test Center looks at the desktop publishing capabilities of Frame Maker on the Next machine; a scaled-down version of Fourth Generation, called File Force; and two 25-MHz 486-based PCs from Northgate and Swan. We also publish our second-quarter indexes.

PERSPECTIVES. Trying to bring order to chaos, major vendors arc promising all-encompassing environments. What do SAA and NAS mean to PC managers?

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INFOMARKET. **78**

Quarterdeck's QEMM Update to Ship

Quarterdeck Office Systems will begin shipping next week Version 5.1 of its expanded memory manager, QEMM, which will provide a larger environment for DOS programs than the one currently provided by Windows. QEMM 5.1 will allow network and device drivers, terminate-and-stay-resident (TSR) programs, and other resident resources to be loaded into high memory, leaving more memory below 640K available for DOS and Windows applications.

A new version of Desqview, Quarterdeck's multitasking environment, that offers Windows 3.0 compatibility was also announced.

— Mark Brownstein

Farallon Negotiates to Use Liaison

Farallon Computing Inc. is negotiating with Infosphere Inc. of Portland, Oregon, to license Infosphere's Liaison software for bridging Localtalk with other types of networks. The Macintosh networking company is also seeking to obtain the services of Evan Solley, Infosphere's president and chief programmer. A Farallon spokeswoman said the final deal will be announced next month. Farallon plans to continue selling Liaison as a separate product, as well as integrate Liaison technology into other Farallon products.

— Eric Lach

Adobe Licenses Postscript to Birmy

Adobe Systems Inc. said last week that Birmy Graphics Corp. has signed a licensing agreement to use Adobe Postscript in its output devices. Birmy has previously incorporated a Postscript raster image processor clone from Rips Corp. Emerald processes Postscript files three to seven times faster than its predecessor, Atlas.

— Kristi Coole

Lowe, Miller Promoted at InfoWorld



Michael J. Miller

J. Michael Lowe, editor-in-chief of InfoWorld, has been promoted to vice president of operations. Lowe will be responsible for all strategic and operational functions internal to InfoWorld. "In his 12 years at IDG, Lowe has shown exceptional management skills," said Jonathan Skits, president and publisher.

Lowe will also continue to play an active role in the editorial direction of InfoWorld.

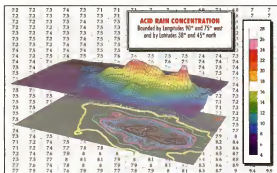
Michael J. Miller, editor of InfoWorld, has been promoted to editor-in-chief. Miller has worked at InfoWorld for five years, formerly as executive editor/technology. "Our No. 1 goal is to provide readers with the information they need to manage large numbers of computers and related equipment," said Miller. "Accurate, timely news and in-depth product evaluations have always been InfoWorld's trademark, and we intend to continue to expand and strengthen those operations."

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NEWS

Multimedia Standards Readied

Apple Formalizing Standards, Seeks Third-Party Developer Input

By PAUL WORTHINGTON

Trying to secure leadership of the potentially lucrative multimedia market, Apple Computer is formalizing a cross-platform set of standards, called Quicktime, with the input of its third-party developers.

At the same time, Apple also revealed plans to incorporate better sound features, image data-size compression, and television-playable output into future machines, according to a letter Apple sent to developers on its AppleLink network.

Quicktime will both limit developers by imposing standards and free them to explore a consistent environment, said Marc Canter, founder and chairman of Macromind, a San Francisco-based developer of multimedia software. Standards for data exchange and compatibility have long been needed in the field, Apple engineers are authoring the new standards, but they are consulting with Macromind on the implementation, Canter said.

The new standards will support the movement of documents and data across platforms, Canter said. Quicktime will consist of three main aspects: an architecture controlling modular Macs, allowing users to record video or music directly into a presentation without an additional peripheral. Also, the Mac's text-to-speech converter, Macintosh, will be updated to provide higher quality output.

Another task now handled by third-party cards, video conversion, will be handled by the planned integration of composite video output into the Mac

hardware, the document said. Apple also plans to implement a real-time software compression scheme, at least partially solving the digital image data-size problem currently stifling presentation creators and desktop publishers. The planned technology will reduce the memory size required for an image by up to 90 percent, easing both storage and transmission bandwidth requirements, Apple said. Apple also stated that it will selectively license technology for inclusion in future operating systems.

Alan Rosman, vice president of C-Cube Microsystems, agreed the advancement of video technology is crucial for the future of multimedia. "Having a file format for motion video and sound is fundamental," he said, noting that format will be implemented by different vendors in different ways if Apple doesn't incorporate a standard into the operating system soon. Rosman said his company was in discussions with Apple so C-Cube's image compression technology could be included in future Macs, but offered no details of a possible agreement.

It may be third-party alliances and development that are driving Apple to create a standard, said Steve Holtzman, Radar, a marketing vice president. "Radar, Macromind, and others are already working closely together, whether or not it's driven by Apple," he said.

Some key sound and video features are already being promised by Apple. In the AppleLink article, Apple vice president Don Casey, leader of the multimedia engineering group, said that sound input and output will be directly incorporated in future modular Macs, allowing users to record video or music directly into a presentation without an additional peripheral. Also, the Mac's text-to-speech converter, Macintosh, will be updated to provide higher quality output.

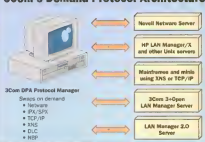
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3Com's Demand Protocol Architecture



3Com's DPA lets workstations access different servers, including Netware, using the server's own native protocols.

3Com Moves Ahead With Its Internetwork Strategy

Announces 3+Open LAN Manager Links

By MARGIE WYLIE

3Com Corp. presented the first fruits of its new strategic direction last week, announcing software to connect 3+Open LAN Manager workstations to other network servers, including Netware.

The first three network transport protocol stacks for 3Com's Demand Protocol Architecture (DPA) interconnectivity scheme, with support for Netware IPX/SPX, TCP/IP, and XNS, are being offered by the company.

Undercoring 3Com's recent retreat from its role as codeveloper of LAN Manager core services, 3Com marketing director Alan Kessler characterized the products as proof of 3Com's commitment to systems integration.

"We're trying to simplify global networking. We really need a common language, and we are ideally placed to provide those services," Kessler said.

Workstations using DPA on a 3Com network can directly access other servers using that server's native protocol. They speak the language of that server without having to reboot their machines.

3+Open Connection for Netware is the IPX/SPX stack that lets 3+Open users access Netware 2.1X and Netware 386 servers. "Once a user switches to the IPX stack and logs into a Netware server, he becomes just like any other Netware station with full access to Netware applications and services," Kessler said.

3+Open TCP with DPA provides access to Unix hosts via ARPANet-standard applications, including File Transfer Protocol (FTP) and Telnet. 3+Open/XNS provides access to mini-

and mainframe hosts that use the XNS transport protocol.

DPA products work with a token ring or Ethernet card with a Network Driver Interface Specification (NDIS) driver, Kessler said.

3+Open Connection for Netware will ship in August; it will cost from \$250 to \$2,195, depending on the number of users. The XNS and TCP/IP stacks ship next month for \$250 to \$2,995, depending on the number of users.

In addition, the company offered a new release of its 3+Open TCP Netbios, giving users access to Hewlett-Packard LAN Manager/X (LM/X) and OS/2 LAN Manager on a TCP/IP network.

3+Open TCP Netbios is available now for \$495 per server.

3Com Corp., 3165 Kifer Road, Santa Clara, CA 95052; (408) 562-6400.

SPOTLIGHT



Toshiba recently announced the Japanese release of its first color laptop, the J-3100SG/101S. The 386-based laptop uses a super-twist nematic screen with fluorescent backlighting to display 16 colors from a palette of 64. The 18.9-pound unit is AC-powered and sells for \$9,860 in Japan.

IBM Offers Internetworking Enhancements

By MARGIE WYLIE

NEW YORK — IBM joined a chorus of computer vendors at PC Expo last week, touting multivendor networking and open standards with its announcement of several internetworking enhancements, including new Token Ring-to-Ethernet gateway and management facilities.

IBM also made a formal statement designed to give its customers a broad outline of the company's direction for supporting Open System Interconnection (OSI) and Fiber Distributed Data Interface (FDDI).

In a departure from its usual Token Ring centrality, the company introduced Ethernet-to-Token Ring routing for PC LANs. The IBM Local Area Network Support Program 1.2, last DOS PC on Ethernet 802.3 LANs share resources with OS/2 PCs on an IBM Token Ring LAN. The LAN Support Program will be available July 27 and cost \$66 per copy and \$44

for each additional copy.

Playing catch-up to Microsoft and Novell, Big Blue also unveiled an OS/2-based remote copy and management tool, Serc. With IBM Distributed Console Access Facility 1.0, LAN administrators can manage an OS/2 Extended Edition workstation over remote links from a central site. It is due November 30, and will cost \$135 for one copy and \$95 for each additional copy.

The 16/4 Trace and Performance Program, in conjunction with Token Ring adapters by the same name, lets LAN administrators monitor information on an IBM Token Ring network, running at either 16 or 4 megabits per second (mbps). Now shipping, the program costs \$1,500; adapters cost \$1,220 each.

The company also announced a V.32 modem, now shipping for \$1,350, an update to its Token Ring-to-Token Ring router, available September 28 for \$1,750; and improvements to its baseband PC Network that allow more nodes

per segment, greater distances between nodes, and bridging into Token Ring networks.

In a formal statement intended to coordinate and clarify several separate statements made during the last three years, IBM said it intends to support several OSI standards as part of its Systems Application Architecture (SAA), including the X.400 E-mail and X.500 naming standards, Common Management Information Protocols (CMIP) and Common Management Information Services (CMIS) functions already available on some IBM systems will also be integrated into Netview under OS/2 in the future, the statement said.

During the next two years, IBM will introduce several products for 100-mbps fiber-optic FDDI networks, including workstation and host attachment controllers between FDDI, Token Ring, and Ethernet LANs; network management for FDDI; and backbone extensions for greater distances between workstations.

Lotus Shows Paradox Data Lens Drivers for 1-2-3 3.0, Rdb

BY SCOTT MADE

NEW YORK — Paradox links to Lotus Development Corp.'s 1-2-3, Release 3.0 and Digital Equipment Corp.'s Rdb database for VAX were shown at PC Expo here last week, promising broader connectivity for Borland International's PC-based DBMS.

Lotus announced that beta testing of the DOS Paradox Data Lens Driver for Paradox Tables has begun at about 40 sites. Testing of the OS/2 Data Lens

driver will begin in about a month, said Julie McNamara, Data Lens industry marketing manager.

Also at PC Expo, Lotus demonstrated how, using familiar 1-2-3 commands, users of the driver can perform within the spreadsheet a wide variety of database management and reporting tasks, such as querying Paradox tables; adding, deleting, or modifying data in the tables; and creating and deleting Paradox tables.

The Paradox driver goes further than the DBase driver shipped with 1-2-3,

Release 3.0, McNamara said. The current DBase driver does not support modifying or inserting new data in the target DBase file, but will be updated to support those functions, she said.

The present Data Lens driver has not met with much enthusiasm at Borland, whose officials want Data Lens to access Paradox data through the recently introduced Paradox engine.

Lotus bypasses the engine because Borland has yet to provide an OS/2 version, and Lotus desires consistent access

methods across platforms and operating systems, McNamara said. Once Borland introduces its OS/2 driver, the Data Lens driver will be modified for the Paradox engine, she said. "Our design goal is to provide a driver people can use now," she said. The Paradox Data Lens driver for Paradox will ship in the fourth quarter, Lotus said. It will work with all Data Lens-compatible products, including 1-2-3/G.

Borland announced that a forthcoming SQL connectivity version of Paradox will support Rdb/VMS, DEC's strategic relational database.

Borland demonstrated at PC Expo how the new version accesses, combines, and manipulates SQL data from Rdb without programming. Paradox will also let users access SQL data through SQL statements and programs written in the Paradox Application Language (PAL). The solution will require DEC's LAN Works, according to DEC.

Although the Rdb/Paradox link will not be included in the first release of Paradox SQL technology, it will be available this year, said Ken Einstein, Borland's application strategy director.

Ingres' GQL Allows Mac Applications to Query Ingres RDBMS

BY SCOTT MADE

Ingres Corp. is scheduled to announce this week CL/I connectivity between supported Macintosh applications and the Ingres relational database management system for VAX/VMS systems.

CL/I, recently renamed the Data Access Language (DAL), is Apple's client/server language. Numerous Macintosh applications already support DAL. The VMS DAL server, now available through Apple, will be distributed and supported by Ingres.

Access to Ingres data and applications will initially be provided through Ingres' new Graphical Query Language (GQL), a Mac front end providing point-and-click access to Ingres, Release 5 and Release 6 data. GQL lets Mac users integrate Ingres data with familiar decision support products. GQL is available now from Ingres.

GQL insulates users from cryptic file names and SQL statements by building queries from a pictorial view of the database and its relational links, Ingres said. Using GQL's GQL/Admin program, MIS departments can rapidly create a graphic template that provides access to corporate data using the included program, GQL/User. With that template, executives can easily create their own queries to fit their needs and integrate the data with spreadsheet and chart applications, Ingres said. Also included is GQL/Design, a rapid prototyping tool for database designers.

DAL-compatible applications can immediately access Ingres, Release 6.2 databases using the DAL server for VAX/VMS.

GQL/User costs \$395 per workstation; GQL/Admin is \$1,995 per administrator workstation; GQL/Design is \$995 per design workstation; and the GQL/Starter Set (including one Admin, Five User, and one Design program) is \$3,995.

Ingres Corp., 1080 Marina Village Parkway, Alameda, CA 94501; (415) 769-1400.



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F504-94G-NCOK

■ MARKET ANALYSIS

Corporate Buyers Still Like 286 PCs

BY ALICE LAPLANTÉ
AND ROXANNA LI NAKAMURA

Despite predictions that the ever-growing number of 486-based systems on the market would kill, or at least stun, the high-end 386 market, that is not the case. Not only are 386-based machines selling well, but sales of machines based on Intel's 80286 microprocessor still dominate over shipments of systems built using more powerful chips.

Workgroup Technologies estimates that by the end of 1990, 43 percent of the personal computer systems shipped will be 286 systems; 28 percent will be 386 systems; and a scant 2 percent will be 486 systems. The study also shows that a whopping 27 percent of the shipments will be 8086- or 8088-based machines.

"The 286 in 1990 is still the dominant processor," said John Dunkle, vice president of Work-

group Technologies, in Hampton, New Hampshire. "The 386 will take off in 1991, with 42 percent of the market by the end of the year."

These statements executives agree that rumors of the death of the 286 system have been greatly exaggerated.

"It has been predicted for over three years now that the 286 market would be in a declining mode, and each year has proved the prediction incorrect," TI said in a recent report. However, worldwide sales in each of the 386 and 386SX PC categories will equal those of 286 systems by 1992, TI predicted at spring Condos.

Machines based on the 486 are far away from dominating sales, said Dunkle and others. Most users are still using character-based DOS applications, and this is unlikely to change in the near future.

"Our average purchase is still

a 286, because it suits most of our needs," said Phyllis Koch, systems manager for Ryder System Inc., in Miami. Koch, like others, said her firm will probably move next to 386SX systems, rather than 386 machines.

"About a year ago, our 386SX sales really started to take off," said Steven Dougherty, product manager at Everest, who added that it was the \$100 price difference between 386SX and full 386 machines that made the 386SX attractive.

Rather than buying the newer 486 systems, as expected by many industry pundits, corporations are buying high-speed 386 systems for their power users.

At Ernst & Young, in New York City, advanced users are given 33-MHz 386 systems until the 486 technology has been proven in the real world.

"Although I'd love to have one in my office, I'm not anxious to be a test site for 486 vendors," said Alex Kask, PC manager for Ernst & Young. "Let others shake out the bugs. I'll buy an 'improved' model a year from now."

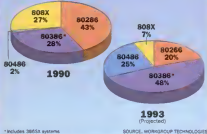
PC vendors say most 486 machines are going into heavy number-crunching applications such as CAD or CAM, or as network file servers. For most personal productivity applications, a 386 machine performs admirably, they said.

One reason that sales of high-end systems lag behind those of 286 machines is that many corporations have changed their PC acquisition behavior.

"We find that when we ask people to characterize the size of their purchases, they are most often in the small-to-medium category," said Bruce Stephen, a PC analyst with International Data Group.

Buying Trends for 80X86 Systems:

(Percentage of shipped units)



* Includes 386SX systems

SOURCE: WORKGROUP TECHNOLOGIES

Will IBM's Home Computers Sell in the Business Market?

With IBM expected to announce its long-awaited home PCs tomorrow, PC managers and analysts say the low price and relatively high functionality could make them attractive for certain business applications.

Called the PS/1 family, the 286-based machines are expected to start at a street price of less than \$1,000, and will be bundled with software applications for the less experienced user, sources close to IBM said. (See "Street Price for IBM Home PCs Expected to Start Under \$1,000," June 11, Page 1.) The machines will be modular in design, easy to service, and will ship to end-users fully configured and ready for use.

Growth in the Home Market vs. the Business Market

	Home Market	Business Market
1990	3,548,000	5,348,000
1993	5,144,800	6,952,400
Growth Rate	15%	10%

SOURCE: WORKGROUP TECHNOLOGIES

Some industry analysts expect the home machines to cut into sales of IBM's Models 25 and 30. Indeed, dealers' concern on this issue may have forced IBM to delay the introduction.

But according to Gina Carter, director of microcomputer marketing for Zenith Data Systems, in Mount Prospect, Illinois, the home market is much more price sensitive than the business market, and is likely to "tolerate" a relatively underpowered machine. Prices alone are less important to corporate buyers, she added.

Other observers say that the PS/1's limited expandability will limit its corporate appeal. Still, the monochrome or color VGA and the IBM label might appeal to firms that otherwise wouldn't consider a "home" machine.

Many analysts said the home market is challenging because people have so many uses for PCs at home, such as office work, household management, and games.

Despite that challenge, other vendors will follow IBM into the home market, according to John Dunkle, vice president of Workgroup Technologies, in Hampton, New Hampshire. He expects the home market to grow 15 percent per year, while the business market will maintain about a 10-percent growth rate.

BOXED DISCRETE CHARACTERS

Spaced Discrete Characters

Run-on discretely written characters

Cursive script writing

SOURCE: IBM J. J. WATSON RESEARCH CENTER

Run-on printed handwriting (third line from the top) can be recognized in real time by software using a new IBM technique.

IBM Improves Handwriting Recognition Technology

BY ROXANNA LI NAKAMURA

A handwriting recognition technique that lets computers run on hand-printed characters in real time was detailed last week by IBM researchers, who said they had overcome limitations that previously required users to print characters in predefined boxes or spaced at regular intervals in order to be recognized.

The software can recognize touching and overlapping letters as well as Chinese and other writing systems. It can also handle preformatted and math symbols, musical notes, and other marks. While the technique does not yet allow for recognition of cursive script, this advance is a significant step toward that goal, according to IBM.

"Recognize-then-segment," a new technique developed by IBM's T.J. Watson Research Center, reverses the "segment-then-recognize" procedure that has been

used to enable computers to read handwriting. The new method starts recognition as strokes are entered, launching an algorithm that matches characters with the stroke. This is faster than the old technique, in which recognition attempts didn't start until an entire character was entered. IBM researchers have implemented recognize-then-segment in software written in C, running on an IBM RT PC.

The recognize-then-segment work is part of the experimental Paperlike Interface project, underway at IBM's T.J. Watson Research Center, in Yorktown Heights, New York. With the Paperlike Interface, users write with a stylus on a transparent digitizing tablet, which is placed over a flat liquid crystal display. When users enter data, the path of the stylus appears on the display as a kind of "electronic ink." The system can also be used like a mouse to select and drag objects on-screen.

Microsoft Readies Windows 3.0 SDK, C 6.0 With Programmer's Workbench

BY STUART J. JOHNSON

Microsoft revealed more of its development tools strategy last week, announcing that a shrink-wrap edition of the Windows 3.0 Software Developer's Kit (SDK) will be out soon and a 32-bit version of C 6.0 is ready.

The commercial version of the Windows 3.0 SDK is "in manufacturing and will be on store shelves in a few days," said Fred Gray, general manager of Microsoft's languages group.

Registered users of previous versions of the SDK will be able to upgrade to the \$500 package for \$150; those who purchased an earlier version of the SDK will be able to upgrade at no cost, according to the company. The SDK will include a Windows 3.0-compatible version of Codeview, the company's character-based debugger.

A 32-bit version of C 6.0, which features the character-based Programmer's Workbench (PWB) development environment, will be shipped with the next beta release of the 32-bit OS/2 2.0 SDK, Gray said.

The \$2,600 OS/2 2.0 SDK contains C 5.2, a 32-bit version of C 5.1, as well as Codeview 3.0, a 32-bit version of the debugger.

Microsoft is also developing its promised C++ compiler and a graphical developer's environment somewhat similar to the character-based PWB as separate projects, Gray said.

Microsoft's compiler, which has been under development for several years, will comply with the draft ANSI C++ 2.1 specification with some extensions. It will also be compatible with existing Microsoft C code.

The graphical-based programming environment will extend PWB's internal database, which helps developers debug code and track projects. Extensions support object-oriented programming. Graphics may be used to show data structures and relationships, Gray said, adding that separate Windows and OS/2 Presentation Manager versions of the environment are likely.

— Peggy Watt contributed to this story.

New tricks from the top dog.

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multiple drives in a single bound.

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Backup and burn: rather our unique combination of advanced technologies makes backing up with the new Norton Backup faster than you ever dreamed possible.

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Peter Norton
COMPUTING



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you'll know before you start precisely how much time and how many floppies you'll need.

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CC Corporation and Communications

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P6300 has the guts matrix printer in its class.



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NEC



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Micrografix's Designer provides chart and graphics functions, and its files can then be produced as slides.

Charisma Integrates Charts, Graphics, DTP

Midrange Package Aimed at Business Users

BY BARBARA DARROW

NEW YORK — As expected, Micrografix Inc. last week introduced Charisma, which brings word chart, business graphics, and desktop presentation capabilities under one umbrella.

Positioned between Micrografix's Graph Plus at the low end and Designer at the high end, Charisma is a Windows 3.0-specific application that will give business users 90 percent of the features they need, according to Paul Grayson, Micrografix chairman and CEO, who unveiled the product at PC-Expo here last week.

"Charisma gives users real illustration capabilities — not just squares and circles but full-feature Bezier curves, outlining, and special effects," Grayson said. The package ships with 2,200 pieces of clip art, 35 Blitstream fonts, and six URW fonts. (See First Look, Page 71.)

For users who don't want to

design charts, Charisma has an automatic word charting feature with several templates. The program also provides an electronic presentation facility, so users need not have Charisma to run a presentation that was created with the program. Charisma also reads files from Harvard Graphics, Lotus 1-2-3, and Microsoft Excel.

Integrated products such as Charisma make it easier for large companies with diverse graphical needs, because they don't have to support a large number of graphics products, said Arthur Block, vice president of Manufacturers Hanover Trust, in New York.

The \$495 program is available now; registered Graph Plus users can upgrade to Charisma for \$99.

Micrografix Inc., 1303 Arapaho, Richardson, TX 75081; (214) 234-1769.

— Kristi Coale and Ed Scannell contributed to this report.

Windows, OS/2 Wingz Ship in One Box

BY BARBARA DARROW

NEW YORK — Informix Software Inc. last week launched a new assault on the graphical desktop, releasing a \$499 single-package version of its successful Wingz graphical spreadsheet for Windows 3.0 and OS/2 Presentation Manager.

"These are real graphical products, not ported-over character-based applications," said Rick Lucas, Wingz product manager, at the PC-Expo announcement. Wingz is already available for the Macintosh and Mac A/UX, Sun's Open Look,

and Next systems.

"Putting the [PM and Windows] versions in one box means that end-users don't have to worry about which GUI to choose until later, and retailers have fewer [boxes] to deal with," said Jeff Bork, Informix's vice president of marketing. Users are licensed to use the package in only one operating system at a time, however. Informix recommends 3 megabytes of RAM for the Windows version and 4 megabytes for OS/2.

The new products resemble their predecessors in looks and functionality, so current Wingz

users can move among platforms with minimal adjustment, Lucas said. All versions support large worksheets and are based on Hyperscript.

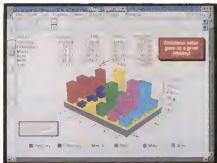
The Windows and PM products also offer the benefits of Dynamic Data Exchange so users can cut and paste data spreadsheets and other Windows or OS/2 applications.

Wingz supports and can import 1-2-3 and Excel files, but it is not macro-compatible with those products. However, Hyperscript can emulate macros if necessary, said Douglas Edwards, Informix's executive director of software marketing. An "intelligent fill" feature eliminates repetitive tasks, such as typing in all column headings, by figuring them out and entering them. "Once people try Hyperscript, they'll realize that it is much more capable than macros," Edwards said.

Despite the product's power, the lack of direct compatibility could lessen Wingz's appeal to dyed-in-the-wool 1-2-3 users, said Tom Schwartz of Main Street Computer Co., a Sarasota, Florida-based reseller.

Informix plans to ship this summer a database component to tie the spreadsheets into Informix SQL databases.

Informix Software Inc., 4100 Bannock Drive, Menlo Park, CA 94025; (415) 926-6300.



Wingz for OS/2 and Windows share many features with the other versions, but were written separately for each environment.

SAS Begins Beta Testing Integrated Applications for OS/2 PM

BY SCOTT MACE

Beta copies of the OS/2 Presentation Manager version of the SAS Applications System have been sent to 200 sites, SAS Institute announced last week.

SAS is an integrated applications system for data access, management, analysis, and presentation, now available for DOS, Unix, and other host systems. Users of the OS/2 product will be able to take ad-

vantage of OS/2's multitasking, Dynamic Data Exchange, and graphical user interface. Using OS/2's clipboard, users will be able to transfer raw data, charts, plots, or graphics among SAS windows in the same or separate sessions, or to a non-SAS window in another PM application.

Support for OS/2 Named Pipes lets users link SAS and other applications and transfer data among them, according to SAS. Named pipes are support-

ed between processes on a local machine or across a network. Unnamed (or anonymous) pipe support allows SAS to receive data from an external process.

Other OS/2, Version 1.1 features supported include raw data acquisition from COM port monitoring devices and OS/2 environment variables. Supported OS/2, Version 1.2 features include the High Performance File System, extended file names, and extended directory names.

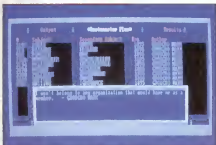
SAS is also available on a number of host systems, and SAS for OS/2 will support a variety of OS/2-to-host tasks, including text and binary file transfer and SAS file transfer between hosts. SAS jobs can also be sent to execute on the remote host, with all output and messages directed back to the local SAS session for display.

OS/2 Extended Edition Database Manager is supported through the SAS System's Multiple Engine Architecture.

Due out this fall, SAS for OS/2 will support IBM LAN Server, Microsoft LAN Manager, and Novell Netware.

SAS Institute Inc., SAS Circle, Box 8000, Cary, NC 27512-8000; (919) 677-8000.

PRODUCT SPOTLIGHT



Writers and speakers seeking inspiration or an apt remark can sift through the Rbase 3.0 database of 3,000 quotations on 800 subjects by 950 authors. The database, from Penncorp of Houston, is aimed at business communications use and allows a search by author, era, subject, or a combination. Quotebase files cost \$25 each for another 500 quotations. (713) 669-0965.

Rbase 3.0 Update Will Need Less RAM And Improve Mouse, Interface Speed

Micromin Inc. expects to ship in late summer a free maintenance update to its Rbase 3.0 database that will require less memory and clean up the interface.

Rbase 3.1 will be pared down to require no more than 480K — possibly less by the time it ships — compared to the current version's requirement of 520K, according to Scott Fallon, Micromin's Rbase product manager.

"We're working on getting it even smaller, without slowing it down," Fallon said.

Micromin is revising the database development system's optimizer, which was rewritten for Version 3.0, and is working to improve the speed of the product's interface, particularly the mouse operation, Fallon said.

Fallon declined to comment on the release of an updated Rbase compiler, which is now available only for Rbase 2.1.1.

Micromin Inc., 3925 159th Ave. N.E., Redmond, WA 98052; (206) 885-2000.

— Peggy Watt



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help and file conversion capabilities.

For more information about the Word family, including our soon-to-be-released OS/2 version, call us at (800) 541-1261, Department K99.

We'd ask you to write, but mail carriers work hard enough already.

Microsoft
Making it all make sense

Wordtech to Ship Faster Versions of Dbase Clone and Compiler

BY SCOTT MACE

NEW YORK — Wordtech Systems will ship in November rejuvenated versions of DBXL and Quicksilver, its Dbase language-compatible clone and compiler.

Speed of the new Arago DBXL 2.0 and Arago Quicksilver 2.0 will equal or better that of the current Clipper and Foxpro, said Michael Gardner, Wordtech vice president. Wordtech claims 120,000 users, most of whom use DBXL. To at-

tract other Dbase language users, the products support the Dbase IV language and MDX index, and convert Foxpro window and memo commands.

"I'm going to spend time evaluating it, and so are a lot of others," said Pat Adams, president of DB Unlimited, a Brooklyn, New York, consulting firm. "The single biggest problem with Wordtech products over the years was they were too darn slow."

Dbase programmers' interest is piqued by time-saving functions that will boost

productivity fivefold, Wordtech said. Arago automatically handles all mouse-oriented events and supports long-sought relational concepts such as one-to-many relationships, and is the first clone to read Dbase IV memo fields.

Arago Quicksilver, compiled in C, will be compatible with major C compilers, Wordtech said. It will produce executable files for distribution without run-time or licensing fees. It includes an overlay linker, automatic run-time environment configuration, and a Clipper-compatible

Extor and Extend C interface.

Arago DBXL has an internal compiler, debugger, applications generator, and screen painter, and will continue to be bundled with Concentric Data Systems' R&R Relational Report Writer.

Arago Quicksilver 2.0 will cost \$695; users of Quicksilver 1.3R can update for \$69. Arago DBXL 2.0 will cost \$495; upgrades from DBXL 1.3R will cost \$49.

Wordtech Systems Inc., 21 Altavilla Road, Orinda, CA 94563; (415) 254-0900.

Language and Batch Commands Supported By Compiler Program

A program that compiles batch files into executable COM programs and provides a range of language enhancements is now shipping from Hyperkinetics Inc.

Builder, announced at the Nantucket Developers Conference this month, compiles directly to RAM on systems with enough memory to support that operation, producing COM, OBJ, or EXE files. The \$149.95 compiler comes with an integrated text editor, on-line help, and drop-down menus.

Builder supports all batch commands, as well as a range of other language commands. Disk operations are supported by the Diskfree command, which determines disk space available; Disklabel verifies the disk; and Rensub renames subdirectories. File operations are supported by Filesize, which returns the size of a file to the application; Readline and Writeline provide file I/O functions; and Getkey and Input allow keystroke input and keystroke processing.

Other language extensions support if/else branching, predefined constants, and a range of screen and menu controls. Hyperkinetics Inc., 666 Baker St., No. 403, Costa Mesa, CA 92626; (800) 873-9993, (714) 668-9234.

— Mark Brownstein

Spellcode 1.1 Checks 1-2-3 Worksheets, Foxpro Memo Files

An expanded spelling checker designed for use by programmers, database developers, and spreadsheet users is now available from Geller Software Labs.

Spellcode, Version 1.1 supports Excel and Lotus 1-2-3 3.0 worksheets, Foxpro memo files, Paradox databases, and Concentric R&R Report Library files.

Spellcode recognizes keywords used by most DOS database languages, and can spell-check Adia, Cobol, Fortran, PL/I and other programming languages. A built-in macro lets users run Spellcode 1.1 within the Brief text editor, or call Spellcode from within applications.

Spellcode 1.1 can check an entire file or designated text. It comes with an English dictionary, and a dictionary of computer terms and program syntax.

The product costs \$99.95; registered users can upgrade for \$14.95.

Geller Software Laboratories Inc., 35 Stephen St., Montclair, NJ 07042; (201) 746-7402.

— Mark Brownstein



This is what
PostScript® software is to
a laser printer.

Adobe to Release ATM for Windows in September

Windows 3.0 users can expect some typographical technology from Adobe Systems Inc. in the next few months.

Adobe intends to ship in September a Windows version of Adobe Type Manager, and users will see even sooner a selection of fonts to bolster their Windows typography.

The \$99 rasterizing utility ATM for Windows generates outlines from bit-mapped fonts for smoother screen fonts and output. Although ATM comes with 13 Type 1 Postscript fonts, Adobe is also

offering its Plus Pack, Adobe Type Set 1, and Type Set 2 for the PC. The \$198 Plus Pack contains 22 typefaces and Type Set 1 and Type Set 2 each contain seven typefaces. Each Type Set costs \$99, and all of these font packages are scheduled to ship in July.

Also arriving on the font front from Adobe is a revised version of its PC Fonts. The new edition will provide an upgrade utility, Font Foundry, that builds screen and printer fonts for DOS applications. Font Foundry is the same rasterizer as the

one built into ATM.

The new version of PC Fonts also lets users print Adobe PC-format typefaces on the entire line of Hewlett-Packard Co. Laserjet printers, from the Plus to the III. This new version is scheduled to ship with every PC-Format Adobe Type Library package this summer. Registered users will receive a free upgrade.

Adobe Systems Inc., 1585 Charleston Road, P.O. Box 7900, Mountain View, CA 94039; (800) 83-FONTS.

— Kristi Coale

Aptec to Offer Program Combining Color Fax, Scanning, and Copying

BY ROXANNA LIJANAKUMARA

A program linking a color scanner, color printer, and modem — integrating the peripherals and adding color copying and color fax capabilities — is being developed for release in September by Application Techniques Inc. (Aptec).

Dubbed Impasto, after a painting term referring to the application of color, the program's graphical interface is designed to resemble office machine control panels and appeal to users unfamiliar with PCs, said Roland L. Guilmet, Aptec's vice president of engineering. Its copier module lets users print scanned files in color, adjust palettes on-screen, and resize images from 10 to 200 percent of original size. A document-prep module lets users view and touch up scanned images before sending the fax.

Impasto supports color fax at up to 300-dpi-per-inch resolution and 16.8 million colors, said Daniel R. Case, Aptec's executive vice president. Color fax is an emerging technology that is not yet standards-based, so both the fax recipient and sender must run Impasto, but users will not need dedicated hardware, Case said. He said he expects dedicated hardware prices to drop, but added, "We are giving people this capability with equipment they probably already own."

The current prototype is downwardly compatible with Group 3 fax, the black-and-white standard used by most fax machines and boards. Impasto works with Sharp's JX300 color scanner and JX730 color printer, but support for other brands will be added in later versions, Case said.

Impasto runs on PC and PS/2 compatibles with 680K of RAM, DOS 2.1 or later, and a graphics display adapter; it will cost \$495.

Application Techniques Inc., 10 Lomar Park Drive, Pepperell, MA 01463; (508) 433-5201.

Icon Pak Gives Users 101 Icon Options for Use With Windows 3.0

Windows 3.0 lets users launch applications by choosing icons, but icon options for non-Windows applications are limited. Software Workshop has answered icon envy by releasing a library of 101 specially designed icons for use with a wide range of applications, including the most often used DOS programs.

The \$49.95 Icon Pak 1 provides icons for such Windows-based and Windows-compatible programs as Dbase, Word Perfect, Quattro, 1-2-3, Norton Utilities, and others, in their several releases. Special icons for devices such as printers, fax boards and scanners, and general purpose icons are also included in the library.

By linking icons to applications, the application may be easier to choose from a Windows Group, according to Icon Pak's developers. The collection offers a large supplement to the icons offered in Windows 3.0's PROGRAMS.exe file.

Software Workshop, 4611 Elk Ridge, Lincoln, NE 68516; (800) 762-9550, (402) 421-7969.

— Mark Brownstein

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Lotus Brings Out Government Editions of 1-2-3

Attempting to raise its profile in the government arena, Lotus Development Corp. is shipping an edition of 1-2-3, Release 2.2 with special features geared to that market.

The enhanced government edition will include Funk Software's Sideswaps add-in, which is almost always in government purchase requests; an electronic tutorial; and a translate utility to let 1-2-3 coexist with the Enable and Multitask spreadsheets frequently used in government agencies, said Alan Minard, director of

marketing for special editions.

"This is a market [where] Lotus does not have its traditional share," Minard said. Lotus tailored special editions of its core products "with extra features to appeal to certain niches," he said. For example, the tutorial is intended to introduce novices to 1-2-3 and provide reference for more experienced users.

A government version of 1-2-3, Release 3.1 is scheduled to ship in the third quarter, shortly after the commercial version, Minard said. "Our intention is to get

government editions out closer to commercial shipments, or to build the extra features right in," he said.

The products will be sold through systems integrators as part of larger procurements and are priced about equivalently to retail packages. The special 2.2 edition costs \$495, and users of Releases 1A and 2.01 can upgrade for \$150. Current 2.2 users can upgrade for \$50; all upgrades are handled through the user's agency, Minard said.

—Barbara Darrow



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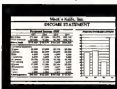
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Lotus 1-2-3 Release 2.2
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PRODUCT PIPELINE

• CAD

LOW-END CADKEY SHIPS. Cadkey Inc. released Cadkey Light, a \$395 low-end version of its computer-aided design system. The release is equivalent to Cadkey, Version 1.5. It has multiple view ports, pop-up menus, and automatic updates of all views when one is changed. (203) 647-0220.

AUTOCAD DRIVERS SHIP. Panasonic Inc. expects to ship next month a display list driver line specifically tuned for Autocad 386. The four DLD386 sets, introduced at the recent Autodesk exposition in Atlanta, support EGA for \$119; VGA and super VGA for \$149; IBM 8514/A and Western Digital, ATI compatibles for \$199; and TGA Version 2 compatibles for \$199. (603) 437-5022.

• GRAPHICS

IMAGE FILE/RETRIEVAL SHIPS. File Room, a \$99 image file and retrieval program, is shipping from Deerfield Systems Inc. The menu-driven program accepts fax input, most scanned images, and ASCII files, stores documents on optical or standard hard drives, and can output to fax or printers. (315) 797-1805.

OCR, SCANNING PROGRAMS SHOWN. Computer-Aided Technology Inc. released this month two optical character recognition packages, with an external interface that from a slot by connecting hand scanners to the parallel port. The \$149 CAT Scan Adapter LPT comes with CAT Image Enhancer software and runs with all hand scanners, said Aloric Lee, CAT president. The \$349 hand-scanner version of CAT Reader Professional, for desktop scanners, uses omni-font technology to read monospaced, proportional, and typeset text; it also provides automatic text merging, graphics elimination, automatic page zoning, and a built-in text editor and spelling checker. (214) 631-6688.

• DATABASES

REPORT WRITER BUNDLED. Word Tech Systems Inc. now bundles Concentric Data Systems Inc.'s R&R Relational Report Writer with its database programs, the \$499 DBXL Diamond Release 1.3R and \$599 Quicksilver Diamond 1.3R. (415) 254-0900.

CLIPPER TOOLS ENHANCED. An update of the Clipper development environment Delip adds a library and lets developers build into their applications any Delip feature—such as its report writer, print manager, dynamic linking, and relational query builder. The \$249 Delip 2.5 from Donny Software Designs also provides source-level and interactive debuggers and an interpreter. (714) 721-6720.

• SPREADSHEETS

SYMPHONY COMPILER SHIPS. Sheng Labs is now shipping Compose, which it says is the first Symphony compiler. The \$795 product compiles WRI files for distribution to end-users, even those who don't have Symphony. It compiles formulas and macros; no royalties are required; and it runs on PC compatibles with 512K of RAM and DOS 2.0 or later. A hard disk is recommended. (503) 646-3691.

HARDWARE

Laserwriters Reincarnated as Laserjet Boxes

BY KRISTI COALE

A new twist on the used PC equipment business: One enterprising fellow is stalking the trash heaps and rummage sales looking for the bodies of fallen Laserwriters.

Don Thompson, who has been repairing laser printers based on the Canon CX and SX engines for three years, reincarnates used Laserwriter motherboards, bringing them back to life by installing them in the cases of Hewlett-Packard Laserjet II.

Thompson got into this line of work a year ago when a surplus dealer had several SX engines that had no motherboards. Thompson works with dealers on a regular basis to obtain spare parts for his printer repair business. "I was going to buy them [the SX engines] anyway," Thompson said. "But I had to decide whether I was going to scrap them out for parts or make them into useful machines."

By opting for the latter choice, Thompson may have started a profitable business. A Laserwriter IINT retails for \$4,499, and an NTX lists at \$5,999. A Thompson-reincarnated NT lists for between \$2,100 and \$2,400; his NTX



To get the DC controller on the SX engine to match up with the NT and NTX motherboards, Thompson had to engineer a new cable.

sells for between \$2,700 and \$3,100.

Roll-your-own laser printers aren't exactly a new concept, however. According to Thompson, others have been making the equivalent of a Laserwriter or Laserwriter Plus by taking a Canon CX engine and a used motherboard from one of the aforementioned printers.

In the SX engine used by Thompson, there is no adapter board, and the connections for imaging signals and for power and ground on the DC controller are different from those on the NT and NTX motherboards. To get the DC controller on the SX engine to match up with the NT and NTX motherboards, Thompson had to engineer a new cable.

This wasn't the only difficult

task—there was also a matter of clamping down parts. According to Thompson, the hardest item to find is the NT or NTX motherboard. Thompson has a crew of surplus dealers who make bids on equipment he needs at auctions of dealerships that have gone out of business. He is able to purchase the SX engines for between \$200 and \$500. Although he wouldn't comment on the price he pays for NT and NTX motherboards, Thompson said he carries plenty of cash when he goes to defunct Apple dealerships to hunt for printers.

Thompson is happy to talk about making these printers. "I've not had any of them back in my shop for repairs yet."

Don Thompson can be contacted at (714) 855-3838.

MARKET UPDATE

Users Want Multifunction Peripherals, Survey Finds

Printing Capabilities, Convenience Coveted

BY ROXANNA LI MAKAMURA

A new category of multifunctional imaging peripherals (MPAs), or Hydras—combining assorted printer, copier, fax, and scanner components in a single product—is catching the attention of corporate buyers.

Once familiarized with the concept, more than a third of users polled said they were interested in buying one, according to a BIS CAP International survey of 420 users.

"We uncovered what marketers call a latent need," said Bob Auster, group director of BIS CAP printer services, in Norwell, Massachusetts. "When you describe these [multifunctional peripherals] to users, they say 'Oh, yeah! Why hasn't anybody done this before?'"

WHAT'S GOOD ABOUT HYDRAST? Multifunctional devices will be the benefit of the new devices, with space savings and flexibility close behind, the users told BIS CAP. They didn't expect to see much cost savings over stand-alone products.

Printing functions are the most important of Hydra's capabilities, the users said, with copying coming next, fax in third place, and scanning considered the least crucial. Virtually all users wanted plain paper output, preferably laser; few were interested in color capabilities. A whopping 90 percent advocated modular designs that would allow multifunctional devices to be upgraded with additional functions.

"Multifunctional peripherals will only succeed if each function works as well as the individual products," Auster said. The

users didn't want to sacrifice features such as high speed and high-density image resolution found in current stand-alone products, he said.

WHAT'S BAD ABOUT HYDRAST? BIS CAP found many users had negative associations with the term Hydra, presumably because Hydra was the name of a many-headed beast slain by Hercules. The moniker, actually an acronym for Hybrid Document Reduction Apparatus, was first applied to multifunctional peripherals in February by Laurence Hooper, a Wall Street Journal staff writer.

If the marketplace is bursting with latent need for Hydras, it is not surprising that some vendors plan to have such products on sale this year. Fully multifunctional peripherals should be widely available during the second half of 1990 and by 1994 there could be as many as 400,000 of them installed, BIS CAP predicted.

However, Hydras are expected to do relatively little damage to sales of stand-alone products, according to additional interviews with vendors, VARs, distributors, and dealers, BIS CAP said.



Xerox's Telecopier 7033 Facsimile Terminal offers 300 dpi scan and print resolution.

TI Shows Light Laptop at PC Expo

BY PATRICK DRYDEN

NEW YORK — Texas Instruments unveiled last week at PC Expo here its 4.4-pound, 1-inch-thick, 286-based laptop.

The Travelmate 2000 with 10-inch VGA display offers different packaging, utilities, and power conservation than a similar model from Sharp Electronics, as well as TI service.

Illustrating how the PC market increasingly mirrors consumer electronics, TI builds the Sharp-designed notebook for itself, Compaq Corp., and others to be announced, said Jerry Rycal, terminal marketing manager. TI also builds Sharp's North American model.

"The thinner page-size design and lighter weight typifies the second wave of laptops," Rycal said. The Travelmate 2000 measures 8½ by 11 by 1.4 inches and weighs 4.4 pounds, including battery pack and 20-megabyte hard disk.

DOS 4.01 and the Laplink Power Touch from Laplink Software are in ROM, for transferring files to the diskless unit. Disk-based utilities let users vary the size and intensity of the cursor, change gray-scale display

from within an application, and perform other functions.

An optional battery pack clips onto the back of the notebook, adding three hours to its two-hour supply. Other options include a 2,400-bit-per-second internal modem, 2-megabyte expansion of the 1-megabyte RAM, and an external 3½-inch floppy drive.

SPOTLIGHT



The new Idea Beetle Mouse shrinks the frequently used mouse button and raises it, for easier touch recognition. It offers Microsoft, Logitech, and IBM PS/2 Mouse emulations. The Beetles will be available in July from Softworks Development Corp. (800) 332-3475.

The Travelmate 2000 lists for \$3,999, the same as a 20-megabyte Compaq LTE 286 or Toshiba 1200XE. Rycal expects distributors to street-price it from \$2,799 to \$2,899. Volume shipment is expected in July.

Texas Instruments Inc., Information Technology Group, P.O. Box 202730, Austin, TX 78720, (800) 527-3500.

Printer Controller Speeds Laserwriter II and Laserjet II Output

BY MARK BROWNSTEIN

A new printer controller from Dr. Design that provides up to four times the first-page print speed of the Laserwriter II, and provides five to 10 times the PCL performance of the Laserjet II is now being offered to developers, according to the company.

The DDI-1600 printer controller board is designed for use with the six-page-per-minute PCL printer engines of the Toshiba, Epson, and Packard Bell are selling printers based on this engine, but using other controllers.

The DDI-1600 controller is

based on the AMD-2900 16-MHz processor. The main logic board fully supports the Phoenix PCL-compatible interpreter, and can be configured with up to 3½ megabytes of RAM. The controller supports two Laserjet II-compatibility modes.

In addition to PCL compatibility, a daughtercard provides support for Postscript, using the Postscript interpreter developed by Phoenix Technologies Ltd. The daughtercard is available with 16-bit configurations ranging from 2 to 8 megabytes.

Aimed at OEM developers, the high-performance boards are expected to be implemented in end-user printers before fall

Comdex, said Craig Schmidt, Dr. Design's vice president of business development. Printers that implement Postscript should be available for under \$2,000 at that time, Schmidt said.

Dr. Design also plans to develop similar controllers for other printer engines, and has demonstrated the capability to produce real-time throughput at greater than eight pages per minute. It is also exploring the use of a SCSI interface to provide faster Postscript throughput, Schmidt said.

Dr. Design Inc., 5415 Oberlin Drive, San Diego, CA 92121; (619) 457-4545.

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Scanners Offer Best of Hand-Held and Full-Size Features

BY ROXANNA LI NAKAMURA

Two vendors have unveiled a new type of scanner that combines the flexibility of a hand-held unit with the scan width and convenience of a full-page, document-feeder model.

Dest Corp. is slated to ship a hybrid scanner in July, bundled with optical character recognition (OCR) software, for a list price of \$995. A model bundled with image editing and slide-show software is set to ship in September, with a \$699 price tag, from ECA/C&C Products Inc. Both scanners consist of an 8½-inch scan head attached to a document feeder that accepts up to 10 letter-size sheets. The scanners deliver a resolution of up to 300 dots per inch and 64 half-tone levels generated via dithering, according to ECA and Dest.

The scan head can easily be removed to allow scanning of images from books and other sources that won't fit into the feeder. The scan head weighs 10 ounces on the ECA model, and 1 pound, 12 ounces on the Dest machine, according to the vendors.

"These scanners will be of interest to people who want to scan images wider than four inches, but who hesitated to pay the price of most full-page scanners," said Jennifer Mitchell, a Sacramento-based analyst for Dataquest's electronic publishing group. A hand scanner that had an 8½-inch scan head but lacked a document feeder was on the market briefly in 1986, she said.

The Bona Portable Full-Page Scanner, which comes with an 8-bit interface card,

was shown by ECA at PC Expo last week. The scanner comes with the Bona Paint image editing software, which can output files in the PCX, MSP, and TIFF formats, and the A4Slide slide-show program, according to Frank Teng, ECA's associate president. Both programs are Windows 2.0 and 3.0 compatible. The Bona scanner works with IBM PCs and compatibles with 640K of RAM, hard disk, mouse, and Windows.

The Dest model, the Personal Scan, comes with a 16-bit interface card and

Version 2.0 of Recognize, the company's omnifont optical character recognition software. Dest plans to offer an image editing package for use with the scanner later this summer, according to Lisa Wood, Dest's marketing communications director. Personal Scan requires at least a 286-based PC or compatible with 640K of RAM and a hard disk.

ECA/C&C Products Inc., 38 Route 46 East, Lodi, NJ 07644; (201) 478-0302.

Dest Corp., 1015 E. Brokaw Road, San Jose, CA 95131; (408) 436-2700.



The 300-dpi Dest Personal Scan with bundled OCR software sells for \$995.

C-Cube Implements Chip With Proposed Compression Standard

A proposed standard for compressing high-resolution four-color images while producing high-quality printed or displayed output has been implemented in a processor chip that is now available for testing from C-Cube Microsystems Inc.

The Compression Master/PC is an ISA-bus board that incorporates the C-Cube CL550 processor. The processor implements a specification for image compression that is referred to as the JPEG (Joint Photographic Experts Group) specification. Using the JPEG spec, still or motion images can be compressed by a factor of 20 times with no visible quality degradation. Images are compressed for storage or transmission, and decompressed for viewing, printing, or editing.

In the past, a print job may have required as many as 16 or more megabytes of disk space to store the image.

Adobe Postscript Level 2 will incorporate the JPEG spec, according to C-Cube. Users will be able to select compression factors from 10:1 to 100:1. Currently, the compression processor and the Compression Master/PC development boards are targeted for OEM developers. Modified versions of \$3,000 development boards are expected to become available at significantly lower prices once volume production of the boards, or boards using the processor, is ramped up.

C-Cube Microsystems Inc., 399-A Trimble Road, San Jose, CA 95134; (408) 944-6300.

— Mark Brownstein

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Philips Unveils High-Performance PC Line

Philips Consumer Electronics Co. has introduced the Magnavox Maxstation line of high-performance computers.

The Maxstation 286 is based on a 286 processor, and includes a 1.44-megabyte 3½-inch floppy drive, a 1.2-megabyte 5¼-inch floppy drive, a 40-megabyte hard drive, 1 megabyte of RAM, 16-bit VGA graphics, five expansion slots, and DOS 4.01. The suggested retail price is \$1,899.

The Magnavox Maxstation 386-SX is an upgrade featuring a 386SX processor. The suggested retail price is \$2,399.

Philips also announced the Magnavox Magnum GL and the Magnavox Magnum SX, targeted at power users. Both computers come standard with a VGA monitor, internal 2,400-bps-per-second modem, a mouse, DOS 4.01, a Prology subscription kit, and Alphaworks "Six-In-One" integrated software. The Magnum GL is based on a 80286 chip, and includes a 1.44-megabyte 3½-inch floppy disk drive, a 40-megabyte hard disk, 1 megabyte of RAM, 16-bit VGA graphics, and four AT expansion slots. The suggested

retail price is \$2,299.

The Magnum SX is based on a 386SX processor, and comes with a 1.44-megabyte 3½-inch floppy disk drive, a 1.2-megabyte 5¼-inch floppy disk drive, an 80-megabyte hard disk, 1 megabyte of RAM, 16-bit VGA graphics, and three expansion slots. The Magnum SX's list price is \$2,799.

Philips Consumer Electronics Co., 1 Philips Drive, P.O. Box 14810, Knoxville, TN 37914-1810; (615) 521-4499.

—Alice LaPlante

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PRODUCT PIPELINE

SYSTEMS

AST CUTS SYSTEM PRICES. AST Research announced price cuts ranging from \$200 to \$1,800 on selected EISA- and AT-bus Premium 486 desktop and tower PCs. AST said hard drive price reductions enabled it to drop prices on the 25- and 33-MHz systems by 2 to 11 percent. (714) 727-4141.

WANG INTRODUCES 386DX. Wang Laboratories Inc. is shipping its PC 380/33C, a 33-MHz 386-based system, priced starting at \$5,995. The base model comes with 1 megabyte of RAM, 64K of cache memory, and a 1.2- or 1.44-megabyte floppy drive. (508) 459-5000.

GRAPHICS

PRICES DROP ON HEADLAND VGA GRAPHICS CARDS. Headland Technology has trimmed prices on Video Seven graphics cards that support 256 colors in Windows 3.0. These include the 512K VRAM VGA, both the 256K and 512K VGA 1024i, and the VEGA VGA. (415) 656-7800.

PANASONIC INTRODUCES MULTIFREQUENCY MONITORS. Two new multifrequency color monitors were recently announced by Panasonic Office Automation. The Panasonic 13-inch color monitor offers front-panel control of brightness, contrast, vertical and horizontal sizing and centering, text color, mode, and power. Supported IBM video input includes VGA and 8514/A. The C1381 with 28mm dot pitch costs \$699. The C1391 with 31mm dot pitch and a broader input range costs \$899. (201) 348-7000.

POWER BACKUP

UPS PROVIDES SITE WIRING DIAGNOSTICS. American Power Conversion is shipping the Smart-UPS 400, an uninterruptible power source that offers sine-wave output, diagnostics, and self-check monitoring. The \$499 unit diagnoses poor grounding and reversed polarity, while on-board load and volt meters show how many devices it will support. In the event of a blackout, it provides enough battery backup to keep typical systems going for 15 minutes, and it can automatically shut down LAN file servers to preserve data. (401) 789-5735.

SCANNERS

HITACHI UNVEILS COLOR SCANNER. A full-color desktop scanner with 600-dpi-per-inch resolution has been announced by Hitachi Sales Corp. of America. The HS-700 will ship in October, at a list price of \$5,000. The scanner is SCSI-interface compatible, can produce 256 gradations of each of the basic colors, and features error diffusion technology that increases image crispness. (213) 605-2537.

UMAX BUNDLES CAERE OCR SOFTWARE WITH UF-32. Umax Technologies Inc. is now shipping its Turbo OCR Scanner package. For \$2,595, users get Caere Corp.'s Omnipage optical character recognition software; Microart image editing software; the Umax UF-32, a 300-dpi-per-inch flatbed scanner; and the Umax ADF-30 25-page automatic document feeder. (408) 982-0771.

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TECH TALK ■ BY STEVE GIBSON

Windows 3.0 Discourages Conventional DOS Applications

Beginning with Microsoft's belated announcement of Windows 3.0 several weeks ago, we

began discussing Windows' memory-model functionality. Then last week, depending upon your pre-Windows 3.0 system configuration, you either endured or cheered my negative feelings about Windows incompatibility with advanced

386 systems.

This week let's look at what Microsoft has achieved with Windows 3.0 on 386 systems.

Despite the fact that Windows 3.0 does offer operability on non-386-based systems, its 386 Enhanced mode can exploit the full capabilities of 386s so fully that it's hard not to imagine that Windows was reborn specifically for the 386.

Enhanced mode manages conventional memory below 640K and extended memory above 1 megabyte in much the same fashion as Windows' Standard mode. Essentially the sum of the two memory forms is available to Windows applications. As in Standard mode, DOS applications running under Enhanced mode are limited to slightly less memory than before Windows was loaded.

Unlike Standard mode, Enhanced

mode uses the "twilight zone" region above 640K and below 1 megabyte for two purposes. It can use the 386's memory management hardware to emulate late extended memory (EMS) for use by any DOS programs running in conventional memory, without the need for EMS hardware. Windows also creates "API translation buffers," which allow DOS and device and network drivers, which are necessarily stuck in conventional memory, to interact with Windows and applications code operating in extended memory.

However, Enhanced mode's requirement for these API translation buffers creates a not-well-publicized glitch. If there is not enough free space in the twilight zone for both the EMS page frame and the API translation buffers, space for the latter will be allocated from conventional memory, thus further reducing the memory available to all those old-fashioned DOS programs. Since Windows' multiplicity of INI files does not allow unneeded ROM to be utilized by Windows, running out of space is not unusual. Moreover, the use of Windows' EMM386.SYS EMS emulator forces the API translation buffers into conventional memory residence.

To add insult to injury, any availability of EMS memory under Enhanced mode requires a contiguous 64K of unoccupied twilight zone memory, which is lacking in systems that cannot disable their high-memory ROM.

By far the most stunning feature of Windows 3.0 Enhanced mode is its use of the 386's demand-paged virtual memory capabilities. Many Windows 3.0 users are quite surprised the first time they look into the "About" selection of the Help menu in the Program or File Manager. This entry shows the available system memory, which is a sum of the system's actual physical memory plus the system's disk-resident virtual memory. Seeing a healthy 8 megabytes of available memory on a 2-megabyte 386SX is enough to make most people believe in a Santa Claus whose last name is Gates!

After playing with multiple moderately sized Windows 3.0 applications in a deliberately down-sized test system, I can readily assert that Windows 3.0 demand-paged virtual memory is a good thing for memory-tight systems. By masking the real memory limits from all Windows applications and even DPMI-aware DOS applications, Microsoft has moved several aspects of the system's functionality into the mainframe leagues.

If only Windows applications will be run on a hefty 4-megabyte 386 system with a fast hard disk, Windows 3.0 would be a total win. My sole gripe with Microsoft is that the features and limitations of Windows 3.0 turned out to be heavily slanted away from the continuing operation of conventional DOS applications.

When the dust has settled from the announcement of Windows 3.0, the industry will have to decide whether Microsoft is big enough to make us swallow this sour pill. For myself, today, I'm neither ready nor willing to give up my 386 and my traditional DOS applications to Windows.

Steve Gibson is the developer and publisher of *Spin Rite* and president of Gibson Research Corp. of Irvine, California. The views expressed are his own.

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supports on-screen multitasking of Windows applications. And Dynamic Data Exchange lets you link data in one program to that in another.

Finally, Windows 3.0 breaks the 640K barrier to give 286 and 386 users full access to their machines' power and memory.

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PRODUCT PIPELINE

MODEMS

GROUP 3 FAX SUPPORT OPTION ADDED. Digi-com Systems Inc. (DSI) announced an option for its V.32 modems that enables users to send and receive Group 3 fax transmissions at 9,600 bits per second. The Flash Fax option is available for \$100. In July, DSI will offer the Plus Option, a \$200 option and upgrade that provides the company's V.32 modems Flash Fax as well as V.32bis and V.42bis capabilities. (408) 262-1277.

E-MAIL

TOPS ADDS SMTP GATEWAY. Tops Inbox users can now swap messages with Unix-based E-mail users via the company's new SMTP gateway. Now shipping, Mail* Link SMTP prices range from \$249 for two users to \$4,950 for 100 users. (415) 769-9669.

ROUTER

ROUTER UPDATE SUPPORTS APPLETALK SERVICES. Ethernet Macintosh users can use Appletalk services with Wollongong Group's updated Mac Gate Way AT 2.0 Ethernet-to-Appletalk router. The price of the update ranges from \$179 to \$295. In addition, the company has released an updated Mac Path Way Access 1.2 TCP/IP file transfer program that includes pull-down host menus. Simple Network Management Protocol (SNMP) agents, and HyperCard-based installation for \$2,295. (415) 962-7100.

LAN BACKUP

SYSTEMS NOW BACK UP ALL NETWORK 386 FILES. Maynard Electronics' Mayn Stream 3.0 — (714) 252-8013 — and Irwin Magnetic's Ez Tape 2.1 — (407) 263-3500 — LAN backup software are now capable of backing up all Network 386 files, including binaries, to workstation-attached devices.

FAX SOFTWARE

SUPPORT FOR GAS FAX INTERFACE ADDED. SBT Corp. has announced the Corporate Contact Manager (CCM), software that exploits the Communicating Applications Specification (CAS) PC fax interface, which enables users to send contracts, bills, or sales literature with a personalized cover sheet from within the database. The database requires Foxbase+/LAN 2.1 or Foxpro/LAN 1.02. The \$1,395 program includes a messaging system. The SBT Communications Server for Novell, 3Com, and Netbios LANs supports other CAS-compatible software and provides a fax front end for in-house developers, according to the company. The server software is priced at \$695, and includes a CAS fax card for \$1,095. Both products are scheduled to ship in July. (415) 331-9900.

SOFTWARE HAS WYSIWYG FAXING CAPABILITIES. A new program from Metro Software lets users fax WYSIWYG copies of pages, including fonts and graphics. PC Artifax is capable of converting LaserJet-formatted files printed to disk to PCX files that can be transmitted by most fax boards. PC Artifax is scheduled to be available July 1 for under \$200. (800) 621-1137.

Net Port Hooks Printers to Network LANs

NEW YORK — Intel kicked off its own LAN enhancement line here last week with a small, inexpensive print server for Network networks.

Net Port is a book-size device that lets users on a Network network attach a printer anywhere that a PC could go on the network. It was jointly developed with Phoenix-based Microtest, makers of the Lan Port peripheral sharing device.

Using Network's prior services or on-board prior server firmware, Net Port lets LAN users share printers without sacrific-

ing a PC as a dedicated print server, said Mark Christensen, Intel product line manager. "If you look at the cost of using even an AT as a server, you are running up on \$1,500 after you buy the Ethernet card," Christensen said.

Network administrators can remotely configure and control the device. It ships with all software loaded in Flash Electrical Programmable Erasable Memory (EEPROM), Christensen said.

Net Port has one parallel and one serial port and supports plotters.

Net Port supports thin Ethernet on a Network 2x or Network 386 network. The company plans to support other topologies and network operating systems, such as LAN Manager, in the future, Christensen said.

Net Port is expected to be available in July, and costs \$695.

Intel Personal Computer Enhancement Operation, 5200 N.E. Elam Young Parkway, Hillsboro, OR 97124, (800) 538-3373.

— Margie Wyde

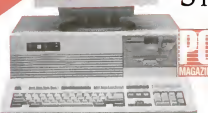
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Toshiba America Information Systems Inc., Computer Systems Division

FDDI

Continued From Page 31

ference and radio frequency interference (EMI/RFI). "If you're talking FDDI over unshielded twisted pair, that'll radiate like crazy," said one systems integrator. Fiber, on the other hand, provides all that bandwidth and speed without EMI/RFI worries. *

DESKTOP AS BOTTLENECK. Assuming that plans for FDDI over twisted pair fly through ANSI's standards-setting process, it's unclear how many users could immediately put that bandwidth to use at their desktops.

Engineers, scientists, and other power users would use more bandwidth right away—maybe not 100 megabits, but certainly more than 10 or 20, said Micro One's Jackson.

Researchers at NASA Langley, for example, would like to interact in real time with the center's Cray 2 or Convex minisupercomputers using their Sun workstations, said Ed Riddle, head of the center's communications and network systems branch, in Hampton, Virginia. Now they send programs to the Cray for execution and pull completed files back to their workstations for subsequent work.

As multimedia, high-end

electronic publishing, imaging, and other bandwidth-hungry applications go on-line, FDDI will become more critical to end-users, but it's unlikely that the bulk of office 286 and 386 machines will have an immediate need for its capabilities. "You almost need a whole new generation of workstations to be able to fill 100 megabits," said Mary Modahl, networking analyst for the Forrester Group, in Cambridge, Massachusetts.

A dual-redundant 16-megabit setup is plenty for many applications that have overgrown 10-mbps Ethernet, according to Nate Kalowski, vice president of marketing for Proton.

FDDI component pricing remains an obstacle as well. Sun Microsystems offers a \$12,500 FDDI interface option for several of its workstations, but when "you're talking a \$12,000 interface for a \$5,000 machine, that's an issue," conceded one Sun official.

Twisted pair implementations will probably cut these prices in half, but that's still \$6,000 per connection, cautioned Forrester's Modahl.

Even as these companies and ANSI hash out FDDI over twisted pair, time and the industry marches on. "We're already talking about a gigabyte backbone," noted Proton's Salwen. "By the time we get it done, people will be ready for it." □

NIC Introduces Ethernet Adapter Line

BY PATRICK DRYDEN

Joining the ranks of Arcnet vendors who have diversified, Network Interface Corp. (NIC) announced its first Ethernet adapters at spring Comdex.

The 8-bit PC/AT Ethernet and new short-slot Arcnet models are scheduled to ship in August. New 16-bit Arcnet models are also now shipping.

The \$349 10330 supports thick and thin Ethernet cable. The \$449 10350 supports thick and 10Base-T unshielded twisted pair (UTP).

Both Ethernet adapters offer software configuration, visible LEDs showing node and LAN activity, and a 32K buffer

option.

Designed for Western Digital compatibility, the cards include Network 286/386 drivers for 4K packet transfers.

The PC-Arc adapters ship with a new set of enhanced drivers that the company claims are 235 percent faster than RX-Net standard drivers.

The NCR-based Arcnet cards offer zero-wait-state operation, an 8K RAM buffer, improved arbitration speed, diagnostic LEDs, and an internal active hub connector.

PC-Arc 16-bit prices are \$525 for coax star, \$575 for coax bus, and \$575 for UTP Arcnet cabling. The 8-bit models cost \$250, \$295, and \$295, respec-

tively, for the same media. Single and dual fiber-optic support is also available.

Network Interface Corp., 15019 W. 95th St., Lenexa, KS 66215; (800) 343-2853.



Network Interface Corp. plans to add Ethernet to its existing line of adapters.

In Touch FX Routes Faxes to Local, Remote Users

Fax server software from In Touch Software can now route faxes and files to users on local and remote LANs.

Version 1.4 of In Touch FX, formerly called Turbo Fax, sends fax files, as well as files from many popular applications, to "in tray" subdirectories for LAN users and to networked fax and modem cards, said Dan Kelly, In Touch's president.

When recipients open appli-

cation files sent via In Touch FX, the related program is invoked automatically. To send faxes from applications such as Word Perfect, users print to a file, which is then moved to the "out" directory. Incoming faxes can be automatically saved as files, routed directly to a designated printer, or both.

In Touch FX costs \$595 for an eight-user version, and \$995 for an unlimited number of

users. An add-on module, In Touch Trays, which lets users attach notes to routed files, is slated to ship in two weeks at a list price of \$95 per user.

The software is compatible with Novell, Banyan, and 3Com network operating systems.

In Touch Technologies, 32 Ross Common, P.O. Box 806, Ross, CA 94957; (415) 461-3600.

— Roxanna Li Nakamura

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MACINTOSH NEWS

PRODUCT PIPELINE

PRINTERS

QUME SHIPS CRYSTALPRINT PUBLISHER II PRINTER. Qume Corp. is now shipping a Postscript clone for Macintosh users with graphics- and publishing-intensive printing needs that can also be linked to PCs through its standard and Centronics parallel interfaces. The Crystalprint Publisher II is compatible with Adobe Type 1 fonts, and it allows for software switching between Postscript and Hewlett-Packard LaserJet Series II emulation. The 6-page-per-minute printer is based on the Weitek LX-8200 RISC chip and Casio LCS-130 engine. Publisher II costs \$3,995 with 3 megabytes of RAM and is expandable to 6 megabytes. (408) 942-4000.

POSTSCRIPT PRINTER SHARING BRIDGE SHIPS. Extended Systems is now offering a direct Postscript printer connection for either Mac or PC Postscript printers that allows them to share the same Postscript printer. Bridgeport requires no special software drivers and can switch between the AppleLink, serial, and parallel interfaces electronically without any user intervention. The bridge also lets Mac users print Postscript on non-Apple printers. The \$495 bridge will work with the Hewlett-Packard LaserJet II, IID, and III printers with a Postscript cartridge, the IBM Laserprinter outfitted with Postscript, the QMS PS810 Turbo, the Apple Laserwriter IIINT and IIINTX, and compatibles. (208) 322-7575.

FAX MODEM

DOVE SHIPS FAX MODEM UPGRADABLE TO VOICE MAIL. An external fax and Hayes-compatible data modem that can later be upgraded to add voice mail is now shipping from Dove Computer Corp. The Dovefax Desktop, which is priced at \$399, sends data at 2,400 bits per second (bps) and fax files at 9,600 bps. The Dovefax Desktop is the first product to incorporate Rockwell International's RC6624AT Data/Fax Modem Chip Set. The chip set's multiprocessing capabilities will allow the addition of voice mail in an upgrade Dove hopes to have available by August's Macworld show. The modem comes with menu-driven communication software developed by STF Technologies Inc. In the future, software offers advanced fax capabilities such as background send and receive, fax logging, and the capability to convert fax files to formats usable with page layout programs. (800) 622-7627.

Radius Ships Full-Motion Color TV Display System

BY PAUL WORTHINGTON

In a move considered by many as a major step toward combining television and computers, Radius Inc. is due to announce at next week's Digital World conference a color TV display system that offers users a significant new tool for producing multimedia presentations.

The \$2,795 system, called Radius TV, is a digitizer and frame grabber for the Macintosh II that has a built-in cable-ready tuner. Moving television images can be displayed at 30 frames per second, and the viewing window can be adjusted to the full size of the standard 13-inch Apple color monitor at 640 by 480 pixels.

The product is a breakthrough because it allows users

to have regular computer images — such as menus, buttons, and text — appear on the same monitor as the high-resolution live broadcast video.

Material for either a video or regular printed presentation can be captured directly from the airwaves or cable television.

Users can be tuned into news broadcasts while working in their Macintosh applications. Radius TV also decodes close-captioned broadcasts. With that information, the user can set the system to activate the picture and sound for any channel when selected words are used, thus having the computer essentially "scan" news broadcasts for certain topics.

The Radius TV system, available now, consists of an internal Nubus card, the video



Most major video sources can be accommodated through connections on Radius TV's Audio Video Input Processor.

engine, and an external box that contains both an audio/video sound processing module and a television tuner. The product works with all Radius two-page color displays. With the addition of the recently announced Radius Direct Color/GX display controller, the Apple 13-inch color Macintosh monitor is also supported. The controller will be available in July, priced at \$1,095.

Radius is also including its Theatrics image processing software and the Radius TV Desk Accessory for controlling image size, channel selection, volume, contrast, brightness, and color.

The external box, called the Audio Video Input Processor, includes input jacks for two NTSC sources, standard RF connections, RCA-type audio connections, and separated RGB input.

Steve Holtzman, Radius' vice president of marketing, said the product may initially appeal only to niche markets, adding that there may be a stripped-down version for lower-end applications at some later date.

Avi Greenblatt, a New York educational video training developer and Radius beta tester, said Radius TV will have a tremendous impact on the way

he develops training applications. "It opens a whole new avenue for communications by having the computer run support graphics while the live picture window is running also." Greenblatt said the large screen display helps the clarity of his presentations. The system's controls are intuitive, easy to use, with a lot of fine controls for the video parameters.

Multimedia consultant Nick Arnett, of Creative Strategies Research International, believes the fairly aggressive pricing of Radius TV will make it particularly attractive to large companies as a delivery tool for interactive learning programs.

Radius Inc., 1710 Fortune Drive, San Jose, CA 95131; (408) 943-1737.



Software available with Radius TV allows users to manipulate incoming video images.

Aapps Offers Low-End Video Board

For a third the price of Radius TV, Aapps Corp. is offering a real-time color video board with lower resolution and fewer features. The Digivideo Color board can display color cable or broadcast television on a small window and incorporate the video information into presentations or documents.

The \$995 board displays full-motion video in two window sizes: 14 inches by 1.8 inches and 3 inches by 3.6 inches (128 by 108 pixels and 256 by 216 pixels, respectively). The board works with any standard video card configured to run at 8 bits.

The card's TV output is played through a small speaker attached to the board. The board also has an audio-out jack, allowing connection to an external amplifier.

Aapps is including image capture software and Preferred Publisher's Exposure, a 24-bit image capture and paint program.

Aapps Corp., 756 N. Pastoría Ave., Sunnyvale, CA 94081; (408) 735-8550.

SYSTEM 7.0

BY ERIC LACH

Besides giving users more flexibility in organizing their desktops, aliases will also open the door to new levels of functionality.

The capability to create stand-ins for any object on the desktop and access the original objects (called targets) from several different locations within the system means that "users are no longer restricted in navigating through the file hierarchy," said Paul Hudspeth, Apple's product manager for Finder 7.0.

The advantages of this become clear when users drop a document on top of a folder's alias. Although the target folder may be buried several layers deep in the hierarchy of the system's hard drive, the document will be deposited in the target as easily as if it were in front of the user. (Holding down

the Command key and clicking the mouse shows the path of a folder called up by an alias.)

The Alias Manager keeps track of aliases and their targets. Because aliases contain important information about the volume on which the target resides, there are several interesting things that aliases can do. Hudspeth said. For example, rather than keep several large files — such as PageMaker newsletters — on the system hard drive, users can create an alias for each newsletter and then archive the originals on floppy disks.

Because aliases are about 500 bytes of code on average, users save considerable space storing the aliases, rather than the newsletters themselves, on hard disk. Hudspeth said. When users want

a particular file, they click on the alias for that issue. The Alias Manager will then prompt the user for the disk by name, even though there may be hundreds of archived floppies. If two floppies have the same name, the Alias Manager will prompt the user for the correct disk.

The Alias Manager also works over a network. If a user clicks on a document's alias on a file server, the Alias Manager finds the target, prompts the user for his or her network password, and then accesses the document.

If the target is on an unmounted AppleShare volume, the Alias Manager can automatically mount the volume and access the target.

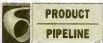
Many developers say they are very impressed by Apple's im-

plementation of aliases. "We have done a lot of experimentation with Alias Manager to see how robust it is and how hard it is to 'break' the link between the alias and its target, and we found it to be very good," said Lynn Alley, vice president of product development for Dayna Communications. "Apple has a number of redundant algorithms that are used in the Alias Manager, and it is very difficult to break the alias chain."

There is plenty of room for developers of utilities that will work with aliases, Alley said. One such utility could allow users to see the invisible connections between alias and targets. "You might want to see exactly where an alias points to in order to know which aliases you are going to undo when you trash a particular target file," he said. □ Next week, making file and system management more intuitive.



UNIX NEWS



SYSTEMS

DATA GENERAL SHIPS 25-MHz 386 UNIX/DOS SYSTEM. Data General has begun shipping a low-cost, 25-MHz 386-based workstation that can act as either a Unix work node or server on an SBC or as a DOS machine. The Dasher 386-25K costs \$4,995 for a configuration that includes 4 megabytes of RAM and a 100-megabyte hard disk. The system's RAM is expandable to 16 megabytes on the motherboard. It has 32K of cache memory and a Super VGA graphics controller integrated onto the system board. A floppy drive also comes with the system. There are four ISA slots that can be used for expansion. In addition to an on-board parallel port and two serial ports, the system will run any popular brand of Unix/386 (SCO, Interactive, AT&T, Intel), according to the company. (508) 870-8162.

ACCOUNTING SOFTWARE

SOLOMON IIS UPDATE ADDS SHARED-MEMORY TECHNIQUE. Solomon Software has updated its Solomon IIS accounting software for SCO Unix System V/386 and Xenix/386. A new on-disk memory management technique boosts processing throughput up to 40 percent during multiuser data entry, accounting, and printing, according to the company. Other upgrades include support for as many as 99 users in 25 Unix or 99 Xenix accounting databases, a new "terminal" utility, and four data import screens. Version 5.2 starts at \$795 for five users. (800) 879-2767, Ext. 782.

WINDOW SOFTWARE

SOFTWARE LINKS IBM X TERMINAL TO DEC-STATIONS. Advanced Graphics Engineering Inc. has created software that lets the IBM Xstation 120 X Window display terminal work with DECstations running X.Ultrix. Called the Software Manager/DEC server, the package is priced at \$625 for a single user license and \$995 for multiple users. (619) 367-7373.

TERMINALS

WYSE TERMINAL OFFERS TEXTBOOK, PC SUPPORT. Wyse Technology introduced a dual-session monochrome terminal at spring Comdex. The WY-160 offers Tektronix 410/4014 and PC graphics support, including VGA, as well as ASCII, ANSI, and PC. The 14-inch display comes in white, amber, or green with 76-Hz refresh rate. The WY-160 costs \$629 and is available now. (408) 473-1200.

HP Debuts Workstations That Run Domain OS, HP-UX

BY MARTIN MARSHALL

Over a year after it acquired Apollo's workstation line, Hewlett-Packard Co. has taken a first step toward merging the Apollo customer base with its own HP 9000 Series 300 customer base—both of which use Motorola's 68000 family of processors.

The mechanism for joining the two is the HP 9000 Series 400 line announced last week. The systems currently use 50-MHz Motorola 68030 CPUs, with 25- and 33-MHz Motorola 68040 processors available later this year, and are capable of booting either Apollo's Domain OS environment, or HP's HP-UX.

"It is not coincidence of environments, although we considered that," said Karl Freund, marketing manager for the merged workstation environment. "It's either one or the other, which is determined by the boot ROM installed when the user orders the equipment." The user must also specify either the Apollo or HP keyboard.

The spectrum of offerings ranges from the low-end diskless Model 400L at \$4,990, up to a super-graphics desktop workstation that carries a price tag of \$93,990.



The HP 9000 Series 400 workstations can be configured to run either HP-UX or Domain OS.

DEC to Use Corollary Multiprocessor Technology in 386/486 System

Digital Equipment Corp. announced that it has licensed Corollary Inc.'s multiprocessing technology in order to produce a multiprocessing 386/486 system at an unspecified future date.

DEC joins Compaq, Zenith, Mitac, and ALR, all of which have begun to ship systems using Corollary's multiprocessing cache scheme and the SCO MPX multiprocessing extension software that supports it.

The Santa Cruz Operation also announced that it had begun shipping the MPX extension.

The Model 400L, which uses a 50-MHz Motorola 68030 CPU and runs at 12 VAX MIPS, is comparable to Sun's recently introduced SparcStation SLX, which claims 12½ MIPS according to HP. The 400L has a 19-inch monochrome monitor with 1,280-by-1,024 resolution, 8 megabytes of ECC (Error-Correcting Code) RAM memory, and 2.15 times the X Window performance of the SparcStation SLX, according to HP.

Those features give the Model 400L a greater display resolution, a larger monitor (19-inch vs. 17-inch), and a better memory scheme (ECC vs. parity) than the SLX.

The Model 400L is intended as a diskless workstation using built-in Ethernet; it does not, as does the SparcStation SLX, have a SCSI port for a local hard disk, tape drive, or printer. "There is an upgrade price for the CPU in that for another \$2,000 you can upgrade it to a [Model] 425L [with] a 20-MIPS 25-MHz 68040 [beginning about October]," Freund said. The memory can also be expanded from 8 megabytes to 16 megabytes at \$2,000 per 4 megabytes.

On all systems, the Motorola 68030 processor and support logic is located on a daughterboard, which can be replaced with a Motorola 68040 and boot ROM when Motorola begins shipping the new processor.

"That could be as early as October 1st, but we're saying fourth quarter just to be safe," Freund said. He expects the 33-

Hewlett-Packard's VRX Graphics Systems

Model	Price	Features	Performance *
VRX monochrome	\$1,200	VRAM 2K by 1K frame buffer	40K 2-D vectors
VRX color	\$4,500	Eight color planes Two overlay planes	130K 2-D vectors
Personal VRX	\$15,000 and up	Uses 33-MHz i860 Four overlay planes P1 (Eight planes) P2 (Eight planes) (16 overlay)	95K 3-D vectors 17K triangles 7K quads 270K 3-D vectors 50K triangles 20K quads Same as P2
Turbo VRX (HP-UX only)	\$41,000 and up	P3 (16 planes) T1 (one i860) T2 (two i860s) T3 (three i860s)	334K 3-D vectors (anti-aliased) 110K triangles 45K quads 592K 3-D vectors (anti-aliased) 220K triangles 90K quads 788K 3-D vectors (anti-aliased) 300K triangles 135K quads

* Performance measured per second.

SOURCE: HEWLETT-PACKARD

MHz version to be available by the end of the year.

HP's answer to the Sun SparcStation 1+ is the 50-MHz 68030-based Model 400L and its 25-MHz 68040 upgrade, the Model 425L ("L" stands for desktop and "L" stands for desktop in HP nomenclature). At \$6,990, the 400L has expandable I/O, including a SCSI port, a parallel port, an RS-232C serial port, and an HP-IB port. It has 8 megabytes of RAM (expandable to 64 megabytes), and can hold up to 400 megabytes using internal hard drives, or 4.6 gigabytes using external drives. It also has networking capabilities through Ethernet, Apollo Token Ring, or IBM Token Ring. At \$8,990, the 400L 2-D color system is \$3,500 less than a comparably equipped SparcStation, and it has twice the X Window performance," Freund said.

The 400L is similar to larger

desktop units and can hold HP's VRX line of graphics accelerators, which were also announced by HP. The accelerators come in three families, including VRX, Personal VRX, and the high-end Turbo VRX (see chart).

The Personal VRX and Turbo VRX both feature the Intel i860 as a graphics processor, with the Turbo VRX offering up to three i860s performing in concert. The Turbo VRX, the successor to HP's SRX graphics line, is only available under HP-UX, however.

HP-Vue, a mouse-driven graphical user interface, will be bundled with all systems as part of HP's Instant Ignition program.

The current combined HP and Apollo installed base is over 250,000 systems.

Hewlett-Packard Co., 19310 Fomerley Ave., Cupertino, CA 95014, (800) 752-0900.

68040 Chips Later Than Expected

When Motorola first showed silicon of the 68040 processor in January, it was expected that the company would produce the chip's volume by June. That production schedule has been quietly pushed back to September or October, as revealed last week in Hewlett-Packard's introduction.

"We've gone through three revisions of 68040 silicon since January and while we're pleased with the product, it's not ready for volume production yet," said Jim Reinhardt, marketing and applications manager for Motorola's 68000 line. The reason, he says, are "boundary cases" where there are interactions between the major modules that are integrated onto the 68040 chip, he said.

The 68040 is not involved in the Hitachi-Motorola legal battle, and due to a cross-licensing agreement with Hitachi, HP's supply of 68030 CPU chips from Motorola will not be affected, an HP spokesman said.

—Martin Marshall

INDUSTRY

NEWS
WIRE

PUBLISHING

KODAK AND IBM FORM PUBLISHING ALLIANCE. With plans to develop a new generation of integrated publishing systems for newspapers and magazines, IBM Corp. and Eastman Kodak Corp. have formed a technological alliance. The venture calls for the Atex Publishing Systems division of Kodak's Electronic Pre-Press Systems Inc. (EPPS) subsidiary to work with IBM's Media Industry Marketing to develop a system based on open industry standards. The integrated system is expected to combine editorial and business functions of publications.

ACQUISITION

LASERMASTER ACQUIRES THE COMPANY. LaserMaster Technologies has purchased the Boston-based font foundry The Company. For now, executives from The Company, including Bitstream and The Company founder Mike Perker, will join LaserMaster. Operations of The Company will continue under the name of Digital Typeface Corp. (DTCF), and its first product will be a \$995 set of 100 Type 1 Postscript fonts for the PC and Macintosh platforms, slated to ship in July. DTCF will also continue developing and supporting its font rasterizer, Nimbus Q, (617) 944-9264.

MERGER

SFA AND BSA MERGE TO BOOST ANTIPIRACY FIGHT. The Business Software Alliance (BSA) and the Software Publishers Association (SPA) have merged in order to better combat software copyright infringement around the world. The BSA, which will retain its name and board of directors, will become the SPA arm that monitors international piracy and public policy activities. The SPA will continue to fight software piracy in the United States and Canada through its Copyright Protection Fund. SPA, (202) 452-1600; BPA, (202) 737-7060.

LAYOFFS

KAYPRO QUILTS STAFF TO THE BONE. Embattled Kaypro Corp. was forced to lay off its 40 remaining employees earlier this month, but 11 loyal staffers elected to stay at work despite the lack of paychecks, said Roy Y. Salisbury, Kaypro's president and CEO. The firm's cash flow recently worsened because several major customers withheld payments, due to an attempt by Kaypro's previous management to regain control, Salisbury said. (619) 431-1588.

TRENDS

Software Publishers
Crack Down on Piracy

Firms Sue to Stop Copyright Infringement

BY ROXANNA LI NAKAMURA

Software counterfeiting—in which pirated programs are sold as legitimate copies—is on the upswing in the U.S. market, according to Microsoft Corp.

MS-DOS has been particularly hard hit by counterfeiters, but Microsoft says short of citing any numbers. The counterfeit MS-DOS is generally sold as stand-alone software, while copyright infringement of other Microsoft software usually takes the form of end-user piracy, said Debra Vogt, a senior paralegal at Microsoft.

Microsoft takes the problem seriously enough to pay for a market sampling program, which Vogt heads, to scout retail and mail-order outlets for ersatz software. The program recently helped uncover evidence for suits alleging counterfeit MS-DOS sales displaced more than \$1.5 million in legitimate sales.

Novell Inc. said its profits have been undermined by another kind of counterfeiting, in which VARs install pirated copies of Netware running under their applications, said Stephen A. Tropp, a Los Angeles-based attorney who represents Novell and the Software Publishers As-



socation.

One index of counterfeiting is the number of lawsuits filed. "We have noticed more prosecutions of cases involving copying and sale of software in the last couple of years," said J.J. Buck Bloomberg, director of the National Center for Computer Crime Data, in Santa Cruz, California. "It's just the tip of the iceberg, but that increase suggests that the businesses being victimized are taking it more seriously." □

Soviets Sign Accord to Export Software to United States

BY MARK BROWNSTEIN

While the Soviets have announced their intention to market software and hardware in the United States, they have so far succeeded only in providing the free world with Tetris. Now they may provide truly useful products.

Not only do the Soviets want to sell software in the United States, they want to be able to guarantee that it will work on domestic platforms. An agreement signed by an official delegation earlier this month forms an alliance between XXXALC, a major testing laboratory

in Los Angeles, and the Soviet Union.

Under the terms of the contract, XXXALC will test the software for compatibility and usability on targeted U.S. platforms. The company will also assist in evaluating and developing user interfaces, with the goal of making the products usable and user-friendly.

While compatibility and other performance problems will be addressed by developers in the Soviet Union, the human interface aspects may be managed by XXXALC. In addition, the company will be involved in documentation and packaging of the

Soviet products. It will also provide marketing assistance.

Little if any hardware will be exported by the Soviet Union for some time, said Anatoly Alekseyevich, director of the Ukrainian SSR Academy of Sciences Institute of Sciences, because the U.S.S.R. is still considerably behind state of the art in hardware development capabilities. Software, however, is a different story, as new software can be developed on hardware that is available now.

Initial offerings are expected to include expert systems for medical and ecological applications.

Multimedia 101: Resellers Go to School

Temp Reps to Tour Country, Educating Resellers About Multimedia

BY PAUL WORTHINGTON

Even when a technology is perceived as hot, few dollars are made if the sales people don't know the products. That reality prompted Alan Hall to found a company whose mission is to teach resellers how to sell multimedia products.

Called Temp Reps Inc., the idea for the Roy, Utah-based company was born when Hall realized that resellers did not know how to sell the products produced by his now-defunct networking company.

Temp Reps has now signed up Mitsubishi Electronics America Inc. and Canon USA, and together they have embarked on a cross-country tour to educate the computer reseller. The goal is a national sales force that can convince the PC buyer of multimedia's appeal and val-

ue, a product's capabilities, and teach how to put the pieces from different vendors together into one integrated system.

With multimedia taking off, sales teams need to be trained on the new products before they can sell them, Hall said.

"We want to introduce the concept of multimedia to the resellers of the country in an inexpensive way, so we will go out and train 1,500 stores this summer on the presentation of multimedia," Hall said.

"We have found an important marketing niche for people who need their products introduced and need the resellers educated on them," Hall said.

The selection of companies was based on presenting an integrated system, and many companies were turned away to competing products wouldn't be included. Mitsubishi's 386 PC

and 14-inch monitor are featured, as is the Canon Xaphot digital camera which, when used with a board from USVid, allows photos to be directly displayed and used on the PC. The system also includes Video Associates' Microkey audio card and software, and ICS Aik Me multimedia authoring system.

While multimedia is being presented as a separate, almost vertical market, it has great potential, said Pattie Adams, Mitsubishi's manager of marketing communications. And while dealers are anxious to capitalize on the current interest in multimedia, many don't know how to present a package to a potential client.

"We are finding that dealers are very receptive to seeing how products can be combined into a package for their customers," Adams said.

Shirley Retires as
Microsoft's COO
And President

BY PEGGY WALT

REDMOND, WA — Jon A. Shirley, president and chief operating officer of Microsoft Corp. since 1983, this week hands over his job titles and day-to-day responsibilities to Michael R. Hallman.

Hallman, 44, came to Microsoft in April from Boeing Computer Services, in Bellevue, Washington, where he had been president since 1987. He was with IBM for 20 years in a variety of executive positions, most recently as vice president of field operations. Hallman oversaw sales and marketing support for IBM's southwest marketing division, including its national federal marketing organization, which handled direct sales to the federal government — a market of growing interest to Microsoft.

Hallman worked with Shirley and gradually assumed his responsibilities over the past three months, and will take on the titles of president and COO effective June 30, the end of Microsoft's fiscal year. Hallman will also join Microsoft's board of directors; Shirley will stay on the board as a consultant for strategic projects, such as recruitment and acquisitions. He retains some \$25 million in Microsoft stock.

Shirley, 51, came to Microsoft after 25 years at Tandy Corp. He helped Microsoft grow from sales of approximately \$50 million at his arrival to the more than \$1 billion expected by the end of fiscal 1990.

Shirley has kept farther from the spotlight than high-profile CEO Bill Gates, but industry analysts also credit his management skills with keeping the Microsoft ship on an even keel through the years, including the company's going public in 1986 and during the move to its current 29-acre site in Redmond.

Shirley now takes a different helm: When he announced his resignation last December, he also said he plans to spend more time on his sailboat than his Microsoft schedule had permitted.



Shirley steered Microsoft's growth to the \$1 billion mark projected for fiscal 1990.

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STATE OF THE INDUSTRY • BY RACHEL PARKER

Back to Basics: IBM, Apple Zero In On the Low-End Market

As we evaluate the merits of servers, network operating systems, and "teletextwide" systems, it is tough to think about the low end. Given the industry's history, it is almost surprising that two major suppliers of PCs are readying low-end systems.

The industry is swimming in rumors about low-end systems from both IBM and Apple. The IBM units, tentatively called the PS/1, are due for formal unveiling later this month. Apple, its reputation for being late to the market intact, is expected to announce some stripped-down Macs in the fourth quarter.

Although the specifics of these machines vary — depending on the prototypes being discussed and the degree of disclosure — both companies are apparently trying to shore up their presence in the low end. Both manufacturers are expected to release color and black-and-white systems that are modularly designed for easy upgrades. And both are expected to break the \$1,000 price level — at least at street prices.

For IBM, the home market has been a slippery monster. The PCjr, best remembered for its chicklet keyboard, was a disaster. In fact, some analysts have blamed the mid-1980s downturn in the PC industry on the failure of the PCjr.

The jr proved that while IBM knows business, it doesn't know ditty about the home market. IBM tried to sell a system that was apparently designed with IBM's image of a home user in mind. Novice users and the technically naive did not need chicklet keyboards or plug-in memory modules: They wanted usefulness at a decent price.

Now the question is whether IBM is making the same mistake again in its real to claim some of the home market. Different channels, support systems, and promotional campaigns are needed to get into homes and schools.

Apple is another issue altogether. A low-end system is a kind of return to its heritage. Long branded the maker of nonserious computers, Apple has spent several years polishing its serious, high-end image. During that time, it let its leadership position in the education market dwindle. The top of the line educational system, the Apple IIGx, is nearly four years old and has been virtually ignored while Apple cranked up the speed and power in the Mac line.

Many in the Apple educational community have watched the company distance itself from the Apple II, expecting the company to replace it with a Mac. Such a move would harmonize the different operating systems and help Apple on its "cradle to grave" strategic goal by getting more people using Macs in school. But that second shoe failed to drop. Apple has simply lost momentum and market share.

Now both of the big companies are coming back to the home and educational market — hats in hand — eager for teachers and parents to buy their systems. After years of focusing on the high end, they are willing to devote some serious energy to the price-sensitive, very de-

manding market of individual buyers.

Why now? It could be that Apple is responding to IBM, fearing for its catchy reputation as the computer for the rest of us. After all, a low-end IBM running Windows 3.0 should be a fairly easy-to-use system at a fairly reasonable price. IBM executives have said publicly that Big Blue is very serious about this previously unreachable portion of the market.

Maybe IBM and Apple believe the market research statistics that indicate the home user represents the market category with the most growth potential for the coming few years.

Or maybe both manufacturers are listening to software vendors' plea that they need to expand their markets to address the home user, the home office worker, and the baby-boom parents in order to revive their U.S. sales.

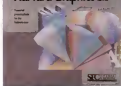
Whatever rationale fits, it is clear that both IBM and Apple see one thing in the low end: units. Lots of them.

What remains to be seen, however, is if the IBM logo or the colorful Apple will appeal to a market that has grown accustomed to being overlooked by these manufacturers. While there is money to be made in individual sales, both companies will have to prove they have the right product and price for this market.

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TECH STREET ■ BY JOHN GANTZ

Unregulated Telephone Firms Would Boost '90s Networking

Sometimes the most interesting events in our industry happen outside of it. One just happened in the telephone industry, and the phone companies are still reeling from it.

Since AT&T's divestiture, its spin-offs have been fighting for "freedom" — to be able to compete in the information industry. What they would like to do is

manufacture telephone and computing gear, sell software, hardware, and maintenance, and provide all manner of information services, from telephone answering services to computer timesharing to cable TV.

Because these companies are regulated, the regulating bodies have constructed a Byzantine, sometimes self-contradictory framework of rules by which they may offer common monopoly services. These

rules, while complex, determine the basic operating environment of the telcos. Change the rules suddenly and billions of dollars in past investment or future plans can be wiped out.

This month three judges sitting on the San Francisco Federal District Court did just that.

Over the years, the primary regulatory body involved with the telephone companies, the Federal Communications Com-

mission (FCC), has developed some complex rules to determine what separates communication (regulated) from computing (unregulated). Because technology has long since fused the two functions and because the country has been fully wired for telephone service, artificial boundaries must be set up to prevent the telcos from using their monopoly franchises to the detriment of competition. The main vehicle for this rule making has been a periodic inquiry by the FCC on the difference between computing and communications — the latest of which, Computer Inquiry III, was concluded in 1986.

The main finding of this last inquiry was that the telcos could offer the information services they desired without doing so through the onerous establishment of separate subsidiaries, as long as they allowed others to offer them as well and published architectural specifications — i.e., their own Open Network Architectures (ONAs).

In early June, though, that panel declared Computer Inquiry III invalid — disputing the FCC's right to preempt state regulation of the telcos. Particular points of contention were FCC rules abolishing the need for separate subsidiaries for the provision of "enhanced" services and Open Network Architectures.

For PC professionals, this regulatory quirk in the telephone industry will be of little immediate impact. But the telcos have been positioning to become major providers of tomorrow's LAN-to-LAN networks through their central office switches and tomorrow's integrated voice and data networks through ISDN technology. As providers of data networks, the phone companies would also like to be providers of data — either access providers to the databases of others or, the rules willing, the database services they themselves provide.

Now all that's out the window, or until the district court is overruled on appeal or Congress changes the law.

It will take the telcos a while to assess the meaning of the court ruling and to decide how much to alter current planning and asset deployment — but if it holds up, the impact will be significant. While the telephone companies have the financial ability to deal with regulations at the state level, without FCC rules automatically taking precedence over state rules, the telcos will be hand-cuffed to roll any kind of service out on a national basis.

I think that's too bad. As the 1990s wear on, we'll find ourselves needing much more in the way of network infrastructure. The device and application demographics at work in the 1990s will drive us into a frenzy of internetworking that will threaten to overwhelm networking professionals in complexity and management difficulty.

The telephone companies could be major backstops — providing tools and services that allow us to build these network mosaics and get on with our applications. If state legislation dominates over federal laws, data networking in the 1990s may be a lot messier than it has to be.

John Gantz is editor of the Tech Street Journal, a newsletter on the high-tech stock market and business performance. The views expressed are his own.

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Through something with the complicated name of Dynamic Data Exchange (DDE), you can simplify your life. For example, with DDE, you can change

information in a Microsoft Excel spreadsheet, and have those changes automatically show up in a "linked" table in a word processing document. Or vice versa.

You can also easily access a network from within Windows. So, no matter how big the rivalry between research and accounting is on the softball field, everybody's on speaking terms in the office.

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At this point, you probably think your machine will slow to a crawl the first time you try any of this.

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What Do All These People Have In Common?



Name: Sally Adams

Occupation: Secretary

Main software: WordPerfect

Famous Question: "I'm a little uncomfortable getting started with DOS. Can you show me how to start this again?"

Solution: PathMinder+ can provide Sally with a simple menu to give her simple key access to her work. The simple menu is perfect for anyone who is uncomfortable with DOS.



Name: Wesley Holmes III

Occupation: Accountant

Main software: 123

Famous Quote: "I wish I could remember which file has those receivables."

Solution: PathMinder+ 's file viewers with spreadsheet can give Wesley a hand. The viewers will let him spreadsheet through 123, dBase, WordPerfect, Word, and many other file types.



Name: Oswald Reeler

Occupation: Engineer

Main software: Anything he can get his hands on

Famous Annoyance: "Hey everybody, come check this out!"

Solution: PathMinder+ allows Oswald to access so many applications and functions that he no longer has time to bother anyone else.



Name: Burton Bradford

Occupation: CEO

Main software: The report generator you had to set up

Famous Last words: "Bottom Line no!"

Solution: With PathMinder+ and a simple menu you can give Burd just what he needs, when he needs it.



Name: INSERT YOUR NAME HERE

Occupation: Supporting all of these people

Main Software: Netscape, 3Com, Word, Windows, Wordstar, WordPerfect, dBase, Paradox, Excel, 123, Turbo Pascal, PKZIP, PKARC, ... you name it, I've used it!

Famous Quote: "Why can't everyone use the same program?"
Solution: PathMinder+ gives you the power and flexibility to support as many applications and users as you need.

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When you're looking for a way to organize your people and their hard drives, you're going to find plenty of products that can help you out. PathMinder+ exceeds them all.

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Unlike the competition, PathMinder+ is the disk management system that can provide all this power to everyone. With PathMinder+ 's Reconfigurable User Interface (RUI), you can build an interface for anyone from a secretary to the CEO.

The power of RUI is limitless. If you have a novice user and you don't want them to erase files, no problem. Just remove the erase command from the menus and your worries are gone. If another person knows how to use their word processor and doesn't have time to

learn to use PathMinder+, you can make PathMinder+ 's keys mimic their word processor. Best of all you can customize each user's interface without any programming. With a few keystrokes or clicks of the mouse you can layout an entire user environment.

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TECHNOLOGY UPDATE

Group Software Forges Ahead

Applications for Workgroups Are Beginning to Tie It All Together

BY CHRISTINE STREMLER

When the first crop of true workgroup software arrived about two years ago, the knee-jerk reaction was the same doom and gloom expressed five years ago about networking: Personal computer users sell their soul to the devil when they become a group of interdependent users. The user automatically loses independence.

The truth is that network users really haven't suffered much. Sophisticated network operating systems and intuitive network management help the network user retain autonomy. The LAN has proliferated, and so has workgroup software, in spite of the doomayers.

While the pickings were slim two years ago, today you can choose from a wide range of features, as well as a wide range of prices in the workgroup software arena. You can buy a product that specializes in sophisticated electronic mail, or versatile calendaring and project management.

WORKGROUP SOFTWARE MUST TIE IT ALL TOGETHER. But nifty features don't matter much if the product doesn't provide a central way to tie all the elements — E-mail, group calendars, project management, contact lists — together. For example, if you delete a meeting from the central workgroup calendar, the product should automatically use its E-mail capability to notify other users that might be affected by the change. If it doesn't, you must do it manually. But you shouldn't have to. Workgroup software should eliminate such drudgery from your communications with peers and associates.

To implement a high degree of automation, workgroup software has got to be network-aware. Stand-alone project managers or calendar programs that install as "LAN packs" probably aren't going to provide such network awareness.

While many products haven't made it nearly as far as they should on the networking evolutionary scale, the overall trend among workgroup software is toward providing relational, integrated modules (perhaps based on a relational database system and industry-standard messaging techniques), as well as more sophisticated network capabilities that include management tools, multiple-server support, and wide area network (WAN) support. Lotus Notes, perhaps the most hyped of all workgroup software, is the most recent example of such sophistication.

Luckily, other software developers are getting smarter about networks, too. If you are running any of the popular operating systems, you can use Novell's Network 3.51, Banyan Systems' Vines, and even OS/2 LAN Manager and its relatives, you will have to work hard at narrowing the field to a manageable number of options. And because there are so many products, the entire market for workgroup software is changing rapidly. This overview takes a look at how trends are shaping — and maturing — workgroup software.

WHAT'S OUT THERE? While store-and-forward-style E-mail is widely considered



the only suitable foundation for workgroup software, many manufacturers have built versatile workgroup products on a foundation of project management and personal and group scheduling.

Several of the project management and scheduling products available for workgroups are stand-alone applications that have been remarketed for networks. As a result, they may rely solely on the file- and record-locking capabilities included in DOS 3.1 to provide a network twist. This approach simply does not hold up under the pressure of multiple-user, multiple-server network environments.

On the bright side, many scheduling and project management products that originally existed as stand-alone products are being revamped and updated. Microsoft Corp.'s Project is one of them. In addition to file locking, Microsoft's Windows-based project management application for Netbios networks has added features such as password protection for increased security.

Traditionally, users configure a network-based Project system to allow one user to act as the "gatekeeper," said Jim Dunnigan, Microsoft product manager. This user has read and write rights for specific projects, and establishes the project schemes — gathering the data regarding tasks and deadlines, creating a chart of the project, and including any notations and special circumstances regarding the project.

Other users can then view the project, but they cannot change it. However, Project allows users to customize the display, enabling them to view only the

project elements that involve them. As a result, each member may have a view that is completely different from another user's because it is relevant only to their own responsibilities, Dunnigan said.

The next version of Project will support Windows' Dynamic Data Exchange (DDE) facility, allowing users to import and export data from other Windows applications into Project, creating a more well-rounded workgroup environment, according to Dunnigan.

E-MAIL ISN'T EVERYTHING. Some stand-alone project management packages were sophisticated to begin with, and are carrying that sophistication over to the network environment. The workgroup version of Chronos Software's calendar and scheduling program, Who-What-When Enterprise 1.0, uses a relational database management system to provide extensive relational capabilities between applications.

Users can generate custom reports from data in Who-What-When's database using Novell's Xtrieve. In addition, using Novell's XQL SQL query facility, users can access the database using SQL calls. As a result, Who-What-When Enterprise can be customized for use in vertical applications such as time and billing systems, and can be implemented using a client/server architecture. Who-What-When does not include traditional store-and-forward E-mail. Instead, its database orientation provides a nontraditional medium for workgroup communication, according to Peter O'Donnell, director of marketing and

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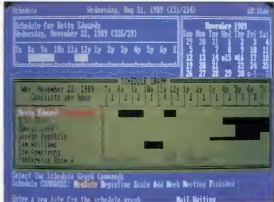
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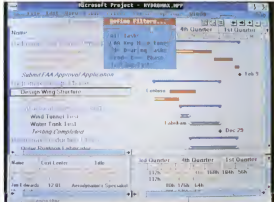
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Higgins' group calendar feature lets users see when their colleagues are free to attend a meeting. E-mail alerts users when new meetings are set.



Microsoft Project for Windows allows users to customize their displays, so group members only see parts of the display that are relevant to them.

communications at San Francisco-based Chronos. Convincing some people of the efficiency of database-oriented communication within the network is a real conceptual hurdle," O'Donnell said. "People think if I don't have E-mail I don't have what I need, but the truth is we give you the same functionality with a different set of tools."

What-When provides each user with a personal daily calendar that shows what the user is doing, who else is participating, the priority of specific tasks, client histories, and project scheduling and management capabilities. On the network, daily calendars can be individually password protected.

NETWORK AWARENESS. Regardless of the engine, all workgroup products have one thing in common: The products build on an infrastructure that users have already accepted: the network. Many workgroup software products take advantage of the network to provide a wide range of capabilities and optimal performance.

For example, Syzygy, from Information Research Corp. of Charlottesville, Virginia, is based on Novell Inc.'s Btrieve database management system. Syzygy is primarily scheduling and budgeting tool for project management. It is actually a classic project management tool, not a strong E-mail program, although it provides some tools for each of these needs. Syzygy uses a character-based interface with menus, and defines each schedule using a hierarchical structure consisting of objectives, projects, and tasks. Tasks compose a project, projects compose an objective. Tasks are usually appointments or to-do items, and are maintained as database records.

The Coordinator, from Action Technologies of Emeryville, California, uses an E-mail orientation to manage projects. It enables you to send different types of messages, all of them designed to fit the natural way people communicate face to face. These message types include request, which proposes something; a counter, which proposes something in place of the request; and a promise, which is a commitment to do something.

The Coordinator was heavily criticized when it was first released for its strict, formalized approach to E-mail. In subsequent releases, Action Technologies has loosened The Coordinator's tight grip, adding a menu-driven interface and making it more loosely defined message types to make the process more natural.

Many workgroup software developers

feel that some of the tools they need to make their products work should be provided as part of the network operating system. But network operating system makers have yet to rise to the occasion. For example, with the exception of Banyan's Vines, none of the network operating systems on the market includes a global naming service. To fill this gap, Novell has licensed the messaging technique Action Technologies uses in The Coordinator, Message Handling Service (MHS).

Several other manufacturers have jumped on the bandwagon and incorporated MHS support into their E-mail and workgroup products. However, MHS does not yet effectively support communication between large networks incorporating multiple servers, bridges, and gateways. While Action is updating MHS to address wide area networking, Novell supports the current version that is oriented toward local area networking.

Software developers contacted for this article agreed that MHS, even with Novell's support and large installed base, is not destined to become the only messaging standard. "I don't think it will ever be a standard outside of the Novell operating system," said Howard Case, marketing vice president of Enable Software's Higgins' development group, in Alameda, California.

"There is a lot of confusion in the marketplace," Case said. "Banyan has its own store-and-forward engine built into Vines. Streettalk is very elegant, very reasonable as a store-and-forward engine. LAN Manager is going to support its own [directory service] also."

As a result of this confusion, workgroup application developers have started incorporating network functionality into their applications. Higgins incorporates a facility that is similar to network-based global naming schemes, but it does it at the application level. In Higgins' Name Synchronization (HNS), the facility maintains lists of users' mail names and addresses in a database on a central mail server, as well as on other mail servers on the LAN and on wide area networks.

These remotely maintained name lists allow Higgins to instantly route messages through the HNS mail servers to users located anywhere on the wide area network. HNS handles messages destined for remote users as standard E-mail, but because they have a remote address, the messages are routed across bridges or dial-up connections.

To maintain the integrity of the name service, Higgins automatically updates

the name databases on each server through a process called replication. The network administrator runs a background program that extracts changes from the name list maintained on the central database. The program consolidates the changes into a file that can be efficiently transmitted as a mail message and distributed to every satellite mail hub maintaining a mail name list.

THE NEXT WAVE. As client/server network architecture begins to make headway, the face of workgroup software is changing dramatically. The promise of more powerful network computing seems to be leading users who can afford the time and expense toward customized workgroup systems. And some software developers are answering the call.

For example, products such as Lotus Development Corp.'s Notes and Saros' Fileshare represent the shape of things to come.

Notes is best described as a distributed document database that uses E-mail communication to distribute the information within the group or across the LAN. Notes uses database technology designed by Lotus on the server, and Microsoft Windows or Presentation Manager as the user interface running at the client. While it includes no scheduling features, Notes' E-mail capabilities are extensive and can be customized to suit specific applications.

Notes includes tools that enable the user or a third-party developer to customize the product. An application programming interface (API) enables users to write custom programs written in C to access data maintained in Notes' central database. According to Lotus director of marketing Brownell Chalmers, the ability to customize workgroup software is going to be essential to the success of the next wave of products in this market. "Notes will be flexible in its definition of the group," Chalmers said. "A group is not a static thing. There shouldn't be any organizational or geographical barriers. If I want a group to be me and a guy in Geneva and a guy in Tokyo, we ought to be able to do that. Notes and other products will get rid of those artificial barriers."

Fileshare, another customizable application, was originally designed as a document control system for workgroups. It uses SQL Server as a database engine and OS/2 LAN Manager's interprocess communication facilities to enable users to store, control, and archive files. Saros

portions of Fileshare as one package, and sold it as a document management system. The client portion, still called Fileshare, is now available separately from the server portion, called Mezzanine.

A facility called the Application Macro Language Support package provides an interface to Fileshare through an application's own macro language. A network administrator or a user can write a few simple macros that will give applications such as Word Perfect or Lotus 1-2-3 access to the document management facilities in Mezzanine.

Fileshare also has an extension that gives applications that use Dynamic Data Exchange (DDE) access to Mezzanine. This widens the choices further to include popular Windows applications such as Word or Excel, and E-mail packages. And the Saros Programmatic Interface (SPI), introduced earlier this year, can be used to customize a stand-alone application—this doesn't require direct access to DDE—to run as a Mezzanine front end.

ACCEPTANCE IS GROWING. Buyer interest is high, and adventurous users see Notes and other workgroup software applications as a means of justifying the network. However, it's clear that all makers of workgroup software face the same problem: Sales cycles are long right now because LANs and accompanying software present a much tougher buying decision than stand-alone applications.

"The sales cycle is running nine to 12 months, because you have to sell the group on [the need for workgroup software]," said Paul Saffo, research fellow at the Institute for the Future, a research and market analysis firm, in Menlo Park, California. As a result, workgroup software manufacturers must stay on top of the technology and continuously improve their products, at the same time keeping prices down.

At least the precedent is there: The same cycle of slow and steady acceptance of networking was played out once before when database management systems began to really take advantage of the multi-user capabilities and performance of the LAN. Nevertheless, the trend continues to move acceptance of workgroup software forward, according to Saffo. "Long-term, [in] five to 10 years, single-user applications will be the exception rather than the norm," he said.

Christine Strehlo is a freelance writer based in San Francisco.



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WORKGROUP PUBLISHING

What Do You Need to Publish on a Network?

BY CRAIG CLINE

You are the production editor for a small publication or in-house publications department. You are on deadline, with minutes to go before you have to hand the diskette to the messenger who will speed it to your service bureau for an overnight rush printing job.

The clock is ticking.

Life would be simple if you could have done all the work on the job yourself—other than the fact you'd probably be divorced by now, or dead.

Actually, the job is a collaborative effort of half a dozen of your colleagues in your department. Months earlier, you bought a Network 286 server (or AppleShare, or 3Com 3+, or Tops—it makes little difference to our story) and wired all of your PCs and Macs to it with thin Ethernet cabling. You're using Microsoft Word, Word Perfect, or Xywrite on your PCs for word processing. Freehand and Illustrator on your Macs to do the art; and Xerox Ventura Publisher: Network Server because you heard it was one of the few true networked desktop publishing applications available.

Your colleagues are madly making last minute changes to their source files (or already updating the files for next week's publication), while at the Ventura Publisher workstation you are making changes and pumping out press pages on your Postscript printer. At last you have everything just the way you want it. You store your changes in Ventura Publisher, which may or may not allow you to save with the Ventura chapter and style files to a diskette. You pass this on to the messenger (your service bureau has Ventura Publisher as well, and will insert your canned logos before going to press).

When you get the finished publication back, you discover that the article on Page 3 is substantially different from the one you approved. Indeed, what you see is a rough rewrite of the article as it was to appear in next week's edition. All of your final edits and changes are gone.

How could this happen? Doesn't Ventura lock files? And doesn't it notify you if a file has changed?

Well, yes and no. Ventura's Network Server does lock chapters, but not the editable components of the chapter. Although it will notify you if the time stamp on the source file has changed since you last stored it, it will do so only if the writer is working on that file. It doesn't warn her changes before you store yours. If the sequence is the other way around—you store before the writer does—your edits are overwritten and you end up with whatever the writer has saved under that file name, even if it's only a weekly to-do list.

REINVENTING THE WHEEL. The point of this story is that for publishers, the fabled "Year of the LAN" is still a long way off. It's important for both users and vendors alike to realize that the functions needed for workgroup publishing are more particular than those required for general office work.

Publishing has always been a workgroup activity. Back in the '70s and '80s—before the desktop computing revolution—publishers bought proprietary systems from companies such as Elec-

tronic Pre-Press Systems Inc. (Atex) of Bedford, Massachusetts, and System Integrators of Sacramento, California, that invented from scratch the concepts of client/server computing, distributed processing, transparent access to a distributed publications database, file locking and sharing, and production tracking and management, to name but a few.

When the desktop computing revolution hit, along with its cousin, desktop publishing, publishers (like most other organizations) sought the price/performance breakthroughs promised by the new technologies. The problem was that most of this technology had been devised with the "personal" of personal computing in mind—not workgroups. Even as

For publishers, the fabled "Year of the LAN" is still a long way off.

network operating systems such as Network and 3+ became more sophisticated, publishers were still dissatisfied. Indeed, it has become an annual practice for users to stand up in workgroup publishing sessions at the fall Seybold Computer Publishing Conference and ask the vendors, "What are you trying to cope with, as one editor put it, 'single-user tools to do a multiuser job.'"

WHAT SHOULD A PUBLISHING NETWORK HAVE? One of the most important functions of any multiuser computing system is to help manage the complexity inherent when groups of people interact in diverse ways.

For a publishing operation, the system can and should help by treating a publication as a collection of component parts, allowing specialists—writers, editors, proofreaders, artists, designers, and so on—to coordinate their separate strengths, keeping these specialists from getting in each other's way; and providing team members and managers with an overview of the current state of the publication and of each of its components.

At this stage in the evolution of workgroup environments, network vendors that treat a publication as a collection of components have allowed groups to do what they do best. As our example illustrated, keeping specialists from getting in each other's way is more problematic. And until recently, providing an overview of the current state of the publication has been nonexistent.

Therefore, to help network vendors and applications developers focus better on the workgroup requirements of publishers, I have compiled a list of 16 items that a good publishing network should offer. As will be seen, some are obvious and available today, whereas others will be unfamiliar to those without a publishing background.

All of the items on this list are essential to construct a good publishing network that is functionally capable of equaling what publishers could obtain from the



proprietary systems they used in the past.

1. FILE LOCKING. The system should prevent two users from editing the same file at the same time, lest one user find his work destroyed when the other user saves the file. If a file is locked, it is nice to be able to determine who is using it. In a pagination environment, the locking issue becomes much more complicated: It is necessary to lock part of a document to limit access to one user at a time, but to also enable other users to have access to other parts of the same document; for example, it may be desirable to allow multiple users to access different pages or different chapters of a long document. In a newspaper environment, on the other hand, it is desirable to limit access to one story to a single user, while still permitting other users to access other stories on the same page. Stories that continue from one page to another present a different problem, requiring text to flow between pages, though access should not be restricted to other stories on either page.

2. READ-ONLY ACCESS. The system should grant read-only access to files already open for editing, allowing other users to inspect or make copies of a file's contents. Most systems that offer this function show only the most recent version on the disk; any editing that has been done in a workstation's memory but not yet stored on the server is invisible to the system.

3. LOG-ON SECURITY. Most network operating systems have some form of log-on security. Users should only have to log on once, not multiple times, as is required when using network applications such as Xywrite and Sarn's Fileshare.

4. JOB TRACKING. In many applications, it is nice to be able to keep track of the current status of any file in the system; who is currently editing it, whether it has been composed or typeset, etc. Some of this is

part of the file's directory entry; the rest should be in a file header record or job-information file. Odesta's document management system provides a third-party solution for this problem, but is currently available only for DEC VAX/Apple Macintosh configurations.

5. USER-CUSTOMIZABLE FILE LISTS. Users should be able to do a directory listing and see more than file names and dates. The directory listing should be customizable and display the job ticket information. This information could include what last worked on the file; where it needs to be routed to next; cost information, such as how much time was spent by the last person working in the file; and what needs to accompany the file, including photos and artwork stored somewhere else in the system.

6. SELECTIVE FILE LISTS. It should be possible to generate file lists across directories based on characteristics in the job ticket. Sarn's Fileshare provides most of the capabilities of user-customizable file lists, but selective file lists in a standard application, but it needs to be integrated with either the network operating system or a dominant application to be truly useful for publishers.

7. FILE MANIPULATION. File routing facilities should allow files to be moved from one directory to another, as well as to be copied into different directories. Users should be able to move and/or delete files without leaving their application programs.

8. FINDING FILES. It should be possible to locate any file on the network by its name, part of its name, job-ticket information, or even its contents. Applications such as Fileshare and Verity's Topic, a full text retrieval system, have some very sophisticated features in this category, but these features should be available to all

the environment.

9. DATA FORMAT TRANSPARENCY. It should be possible to call up a file on any workstation on the network without having to run the file through data translation utilities. Aldus Pagemaker does a creditable job of this on mixed Mac and PC networks.

10. OUTPUT QUEUES. It should be possible not just to queue print jobs, but also other tasks that you might want to send to another workstation for processing. For example, if you want to compose a job and your workstation is tied up in another task, you should be able to queue a job to a "composition server."

Publishing services should be provided by the network instead of applications, because users run many applications to get a publication out.

11. GLOBAL FILE MAINTENANCE. It should be possible to handle certain file maintenance functions globally. For example, after a publication has been completed, it should be possible to archive and then delete all elements of the publication without having to identify each element

manually.

12. VERSION CONTROL. The system should either allow only one version of each file or provide a way of tracking different versions and indicating clearly which is the current one. Again, Saros' Fileshare

provides this functionality in an off-the-shelf package.

13. BACKUP. Whether by some fault-tolerant backup scheme (including redundant disks and controllers) or providing an automatic tape backup program, backing up the system should be painless. You should not have to shut down the network server to perform the backup. Network servers such as Compaq's Systermore are beginning to provide these capabilities as a standard part of the configuration.

14. ELECTRONIC MAIL. E-mail is an important means for users to communicate with other users, but it also serves as a nice ad hoc copy-routing mechanism. Therefore, it should also include an integral store-and-forward capability. E-mail should be an integral part of the network operating system, with a single log-on and name service, as with 3Com's 3+ Mail—but it should also support industry standards such as Novell/Action Technologies' Message Handling Service (MHS) and X.400 to facilitate wide-area messaging.

15. NETWORK FILE MANAGEMENT. Users should be able to treat the entire network as a single filing system. Ideally, they should not have to know on what disk a particular file resides. In practice, many applications make do with filing structures that require users to specify the disk, directory, and computer files they want to access. But this is not the desired solution by a long shot. Fileshare provides this capability.

16. REMOTE EXECUTION AND ACCESS. An application program should be able to run tasks remotely and/or access remote resources on other computers in the network. Ideally, the user should not have to be aware that this is happening.

The exact ranking of the functions in this wish list is open to debate; in many cases it will depend on your organization's style and mission.

A further issue is whether these functions should be implemented in the network or in the application software. Currently, most network vendors and application developers are each saying that these are the others' responsibility, particularly if the function cannot be reduced to a sufficiently lowest common denominator that can be targeted at the masses.

Wherever possible, the services should be provided by the network, because users must run many different applications to get a publication out. To leave these up to application developers results in solutions such as Venture's Network Server, which does a little bit of many of these functions, but few well enough to be completely useful to publishers. Many applications attempt to provide some status information, but no two manage the status information in the same way. Consequently, the information tends to go unmanaged, and a major potential benefit of networked publishing is lost.

Few applications are as robust and demanding as networked publishing, and consequently most network system vendors pay lip service to the notion that a group publishing in one of their key "enabling" market segments. But until they each come to terms with the industrial-strength requirements of network publishing, the solutions they provide will continue to go only part way to making up what publishers had to give up when they junked their proprietary publishing systems and climbed aboard the desktop publishing bandwagon. □

Craig Clive is associate editor of Seybold Report on Desktop Publishing.



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GROUPWARE

Notes Inches Its Way Into the Corporate World

BY BARBARA DARROW

Notes, which Lotus CEO Jim Manzi dubbed the industry's "first robust graphical environment for networked applications," has wooed over some devoted early users, but is still something of a mystery to mainstream PC users.

One reason is that despite all the sound and fury aroused by its introduction last December, the groupware package is hard to describe. Even people who love it have a hard time explaining why, tending to call it names such as "glorified" or "sexy" E-mail, much to Lotus' chagrin. Needless to say, it would have to be pretty sexy to justify the minimum purchase price of \$62,500 (for 200 users).

"People can't realize its capability until they start playing with it," said L. Brewster Jackson, senior vice president of Reuters, in New York. Reuters is tying Notes with on-line data in a product it will resell. But in a typical industry scenario, it's difficult to let users play with Notes until it's installed, and many companies are loath to install it until its worth has been proved.

"We view it as a transformational technology," said Eric Sall, director of business applications for Notes. "It takes a smart person to see the potential because Notes handles applications that were either poorly handled or not handled at all in the past."

In a nutshell, Notes is comprised of an OS/2 server component running Windows or OS/2 nodes. It supports the bulk of existing network operating systems including Novell Netware 2.15; IBM PC-LAN 1.2; 3Com 3+Share 1.3.1; and 3+Open 1.0 and 1.1. Banyan Vines support is planned for this fall.

HOW IT WORKS

participants to communicate with other individuals or workgroups and share different levels of pooled data.

Depending on how it's configured, Notes can periodically update local and remote databases so that all interested parties are reading from the same page. Such data synchronization occurs in the background while the data itself stays close to the user, Sall said. Properly synchronized data can reduce duplicated effort and mistakes caused by the use of incorrect or old information.

Notes allows networked groups to collaborate, to actually hold conversations on the network, according to Mary Stark, product manager at Corporate Software, one of its beta testers. "It's unlike E-mail where you send a message to me and I forward it to my manager and he deletes it and responds to both of us and we delete that. Notes maintains that whole conversation so you can go back and revisit any point and track progress," she said.

New York-based Manufacturers Hanover Trust (MHT), one of the much-publicized early adopters, sees Notes as a way to build and preserve valuable account information that had never been centrally archived before, according to vice president Rich Luciano. "In banking, there's often one account officer or vice president who knows certain companies better than anybody," Luciano said. "If that person retires or leaves the company, you wind that knowledge back into the system."

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succeeds him. Notes helps us build a knowledge base for the future that's constantly updated."

Luciano said the product is invaluable for maintaining all sorts of marketing data or information on clients. "You can put in all your communications with a customer or prospect, and Notes makes it available in a nice front end, in a nicely formatted way to all who have a legitimate need to know."

The network administrator can set

Lotus clearly sees Notes as a way to boost its profile in the network applications market.

levels of access for each user for each file. A user can have no access, or can be given one of the following levels of access: a depositor, who can submit documents to the database; a reader, who can only read documents; an author, who can read all the documents, but only edit his or her own; an editor, who can read all and edit all documents; a designer, who can change the database structure and edit all the documents; or a manager, who can design the database and control the access list.

The package's customizability is both an asset and a liability. Because it is as much an application development platform as an application, people can tailor it to suit their needs, but that takes considerable time and energy.

"About 90 percent of the user's time is spent setting up the network, even if there's a network already in place," said David Marshak, analyst with Patricia Seybold's Office Computing Group, in Boston. The up side is that Notes is one of the first applications truly designed for

network use because it uses the full Netbios stack, he said.

NOTES' PLACE AT THE LOTUS TABLE. Since the proposed Lotus/Novell merger dissolved, integrated last May, Notes has assumed increasing importance at Lotus. The company clearly sees it as a way to boost its profile in the network applications market — both in technology development and implementation and in sales.

Notes is only sold directly, a departure for a company that has relied heavily on resellers to push its 1-2-3 products out the door. The company has not ruled out the possibility of other sales channels, however.

After the Novell merger meltdown, Manzi cited high corporate interest in Notes, saying its sales are "on target." As Lotus will not disclose either targeted or real sales numbers, however, it's hard to grasp how well the product is doing outside of Price Waterhouse, MHT, and a few other large accounts.

The product's new prominence within Lotus has not gone unnoticed. Notes had a "weird genesis," according to one software analyst who has followed the project. "About eight months ago, it was almost spun off from the company. Then they thought it could be a good games piece for some other ideas. It went from being less than equal [to spreadsheets] to kind of equal to nearly more than equal. Since the merger failed, Notes could be the linchpin for getting into this [distributed application] business," he said.

Lotus watchers praised the company for its direct sales approach. "You can't sell this stuff the way you sell spreadsheets. You need to get right to a VP and pitch it," said Richard Silverston, senior systems consultant for Arco, in Los Angeles. "Probably the product's biggest stumbling block is getting a real commitment from the [buying] organization to make it work."

David Athas, analyst with Framingham, Massachusetts-based International Data Corp., agreed. "They want quality sales where both Lotus and the buyer will kick in support," he said.

Notes also tends to unnerve MIS users, according to Strecher. Unless and

until Notes gains an official IBM blessing. MIS departments will wonder what will happen to their grand plans for Office Vision if Notes starts seeping into the corporate landscape, he said.

INTEGRATION ISSUES. While Lotus has been aggressive in linking Notes to existing E-mail schemes via gateways, corporate users are still awaiting Application Programming Interfaces (APIs) that will enable them to knit other application packages into the Notes infrastructure.

Sources close to the company maintain that it has several hundred C-language subroutines finished and will announce them this summer. "They're basically choosing which ones to offer and working up the documentation," said one source.

That'll come as good news to MHT and other corporate users who want to tear down the walls between their applications packages and Notes. "We're rolling out our account officer's profile system that's really useful, but the APIs and other tools Lotus may provide would certainly boost Notes' importance to us by an order of magnitude," said MHT's Luciano.

Lotus is purposely being deliberate and careful with its rollouts, because views Notes as a learning experience, according to IDC's Atlas. "The way they're moving the product in big sales only, they can afford to say [to clients] 'If you want that gateway, we'll write you that gateway.'"

Notes' price raised some eyebrows when it was announced. After all, \$62,500 is a lot in the PC world.

But cost is a matter of perspective. If you look at Notes compared to minicomputer applications that offer many of the same communications capabilities, it's quite competitive, according to Arco's Silverston, whose company considered but did not adopt Notes.

When all is said and done, Notes can average out to about \$500 per seat. "[If] a traditional mini guy knows you've got a machine that'll handle 300 users, he'll charge you for all of them, even though only two of them use the package," Silverston said.

NOTES AND OFFICE VISION. One interesting question is how Notes will fare in comparison with integrated offerings such as IBM's Office Vision. While it is not positioned as a competitor to such offerings, some comparisons are bound to be made.

On one hand, Office Vision is (or will be) an integrated office environment including applications, E-mail, and other tools that can be launched from the desktop. While Notes is more communications-oriented, the addition of new APIs could expedite integration of existing applications as well.

Notes and Office Vision have enjoyed an uneasy alliance — they even share booths at trade shows. “As far as IBM’s concerned, it’s great to have Notes as another PM app,” IDC’s Atlas said. “But I doubt that anybody would buy both Notes and Office Vision. Most people don’t buy two pricey things that do some of the same things, including E-mail. A Lamborghini is more than a Beetle but if you’re in the market for a car, you’ll still only buy one.”

Barbara Darrow is an InfoWorld senior writer based in Austin.

OS/2 NETWORKING

Can We Talk? Named Pipes Confuses, Connects

BY BRETT GLASS

NOS/2 networking feature has caused more confusion in the PC LAN marketplace than Named Pipes, which allows programs running on the same machine — or on separate machines connected to the same network — to communicate with one another.

Named Pipes is designed to work best in situations where one program — such as a database front end running on a PC — is a client and another — for instance, a central database running on a departmental system — is a server. Named Pipes is also useful for other client/server applications such as electronic mail, transaction processing, and remote printing.

A FILE THAT'S NOT A FILE. How do Named Pipes work, and how does it compare to other similar interprocess communication (IPC) mechanisms? A named pipe is a two-way connection between a *client process*—a program that uses a service provided by a server—and a *server process*—a task that runs on the server itself. The client contacts the server by opening the named pipe exactly as it would open a file, then writing characters to the pipe just as it would write to a file. It then retrieves the server's response by using the standard file function calls to "read" the pipe.

Of course, since the named pipe is not really a file (it's more analogous to a telephone line), what each side reads is not at all the same as what it writes. And it doesn't make sense to use the file

function calls that perform random access operations (such as writing the 27th byte of a file); all reads and writes involving Named Pipes are strictly sequential. Still, as long as these constraints don't cause any problems, the client need not know that it's not just opening a file when it's using a named pipe.

WHAT'S IN A NAME? OS/2 also has another communications mechanism called *anonymous pipes* (or simply, *pipes*). But Named Pipes and anonymous pipes are very different from one another in many ways. First, unlike Named Pipes, anonymous pipes are not available to other processes, so that their counterparts in the Unix operating system, are unidirectional, not bidirectional; to establish two-way communications, two of them must be open. Second, anonymous pipes only allow communication between processes with a common "ancestor," or between a "parent" process and its "child" processes. (In OS/2, any process can start other processes, called "child processes," on the same machine at will.) This in turn leads to a third important distinction: Named Pipes can support communications between processes on the same machine or across a network, while anonymous pipes can only work between processes on the same machine.

OPENING THE PIPE. A server process makes a named pipe by issuing a special OS function call: `DOSMAKEMPPIPE`. This function creates a named pipe and adds its name to the file system name space—that is, to the selection of files a process is allowed to open. Just like a file on a network server, the named pipe can be made visible across any networks to

which the server is attached

The server process then issues another call, `DISCONNECTNAMEPIPE`, that waits for someone to open the named pipe. When the client opens the pipe, the call completes and the two processes are ready to talk to one another.

STREAM AND MESSAGE MODES. Once the pipe is open, each of the two processes can send data to the other as a stream of individual characters, just as if it were writing a file from beginning to end. Alternatively, the characters that travel through the pipe may be sent as distinct clumps of characters called *messages*, which can be read all in one piece. (Gordon Letwin, architect of OS/2, likens messages to portions of salami separated from one another by pieces of waxed paper, with several slices of salami, analogous to bytes, between every two slices of paper.)

The advantage of *message mode* is that a command to the server arrives all at once; the server doesn't have to save up characters until it sees one (such as a carriage return or line-feed character) that signals the end of the request. Likewise, the client knows that a response will arrive all at once, instead of dribbling in a few characters at a time.

SERVING MANY MASTERS. A server may use a named pipe to serve more than one client — either serially or in parallel. Once a client is finished using a named pipe and closes it, another client may open it and gain access to the server. (There's also an OS/2 function, `DOSDISCONNECTNPIPE`, that allows the server to cut off a client if necessary.) But in many circumstances, it may be desirable for the server to handle many clients at once.

OS/2's Named Pipes provide for this situation by allowing for multiple instances of a named pipe. A server may start several "server processes," each of which can handle one client. From the client's point of view, these processes are indistinguishable; OS/2 assigns each new client to a different server process.

NAMED PIPES AND DOS. While DOS isn't inherently a multitasking operating system, and therefore isn't useful for server applications without special add-on software, it seems logical to allow DOS machines to serve as clients on a network with Named Pipes. Versions of LAN Manager for DOS do this by making Named Pipes look to a DOS program as if they were DOS files. Besides making it simple for a DOS program to access Named Pipes, this convention has another advantage: The code used in a DOS application and an equivalent DOS application is virtually identical. In fact, if OS/2's "Family API" calls are used throughout the program, the same binary EXE file can run with no changes under either OS/2 or DOS.

NAMED PIPES VS. NETBIOS AND APPC. While many network interprocess communication schemes will undoubtedly be implemented under OS/2, the two primary competitors of Named Pipes are Netbios and Advanced Program-to-Program Communications (APPC). LAN Manager implements both Named Pipes and Netbios, but Microsoft champions Named Pipes as superior because it

automatically handles many aspects of network transactions, including buffer management and security. Microsoft's point is valid; it takes many Netbios calls to perform all the operations done by a single call to one of the Named Pipes APIs.

However, if you do not need all of the features provided by Named Pipes, they may turn out to be wasteful for simple tasks. And Netbios, while it may require more coding effort in certain situations, can often provide better low-level control of communications.

What's more, Netbios offers some key features that Named Pipes does not. For instance, Netbios offers confirmation that a message has been delivered. A named pipe can queue up messages for eventual delivery, but the Netbios session commands are required (by IBM's original specification) to indicate success only after the recipient has gotten the message. Netbios also offers datagrams ("connectionless" communications), broadcast capabilities, and the capability to send a message to a group of recipients via a "group name." Named Pipes does not offer any of these facilities.

Finally, in applications such as Lotus' Notes, which already provide their own access control, buffering, and encryption schemes, a move from Netbios to Named Pipes may not provide any significant advantage.

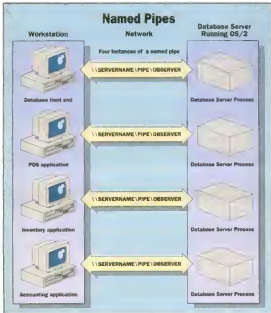
APPC is part of IBM's System Applications Architecture (SAA), System Network Architecture (SNA), Common Programming Interface (CPI), Common Communications Support (CCS), and Common User Access (CUA) strategies. While many APPC functions overlap with those of Named Pipes, the overall philosophies are very different — and users who want to write software that talks to mainframes will probably continue to use APPC instead of Named Pipes.

COMPATIBILITY ISSUES. In the early days of OS/2, rumors were rampant that IBM's OS/2 would not support Named Pipes, causing major incompatibilities between IBM and non-IBM versions of the operating system. Users expressed concern that Netware and other OS/2 LAN implementations that were not licensed versions of LAN Manager would not be capable of handling Named Pipes.

Fortunately, these problems have disappeared as IBM and Novell have provided support for Named Pipes. IBM supports Named Pipes in Version 1.2 of LAN Server, and Novell supports Named Pipes in its Netware Requester for OS/2. Version 1.2, included with the OS/2 Requester is Named Pipes for DOS as well.

Named Pipes was designed for server-based LAN applications, and this is where it is likely to see the most use. It is not the best tool for every job, and it is not likely to supplant Netbios and APPC for all applications; still, you're likely to hear a lot more about Named Pipes as you explore the world of OS/2 networking. □

Brett Glass is one of the original architects of the IEEE 802.5 Token Ring LAN, and currently hosts the OS/2 conference on The Well. He can be reached electronically as [72267.3673] on Compuserve, "glass" on BIX, and "ll-winken/wellfrogue" on Usenet and the Arpa Internet.



In the business system shown above, each program uses the same file name to open the named pipe, but is attached to a distinct process on the server.

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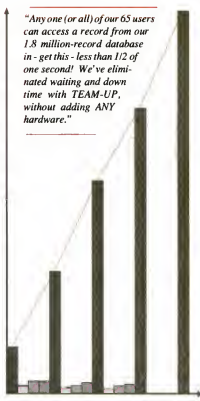
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REVIEW

WD's Ethercard Is One of the Fastest in Its Class

BY RICHARD BRADY LAN TEST TECHNICIAN
AND RAPHAEL NEEDLEMAN
EXECUTIVE EDITOR/REVIEWS

When we last reviewed Ethernet network interface cards (NICs), we were unable to test one of the most popular cards—the Western Digital Ethercard Plus 16—due to a shipping delay (Networks Target Edition, April 16, Page S1).

The Western Digital Ethercard Plus 16 is a three-quarter-length 16-bit ISA network interface card with a 16K transmit/receive buffer. It is an exceptional performer and has the added bonus of costing less than any of the 16-bit network interface cards we have tested.

In this review we use the test plan developed for the April 16 product comparison to put the Ethercard through the paces. Our network interface card bed consists of 12 8-MHz Ethec 286 ATs

(with Everex internally) as workstations, with a Compaq 386/25 (with 7 megabytes of RAM and a Compaq 300-megabyte ESDI hard disk) acting as the server.

Speed scores are based on InfoWorld's network throughput tests in two environments. One test replicates the work of a typical office workgroup: the workstations transfer files; create directories; run Paradox 3.0 tasks; load, spell check, and save Word Perfect files; and load and save Lotus 1-2-3, Release 2.01 files.

The other test, transaction processing, is modeled on a group doing transactional data entry on a shared database. Eight of our 12 workstations add 50 eight-field records to a shared 10,000-record master database while the other four stations run scripts to look up data from the same database. Data entry is a batch process controlled by Paradox 3.0 PAL scripts.

PERFORMANCE:

Office test: When we installed the Ether-

card Plus in both our server and the 12 workstations, it tied the speedy Tiara Lancelot/E AT for top honors. With the Ethercard Plus in the server and the industry-standard 3Com Etherlink II installed in the workstations, the total time to complete the office test was just a second shy of the fastest-recorded score in our April 16 comparison (obtained by matching the server card to the 3Com Etherlink II installed in the workstations). Speed in completing the office test suite is excellent.

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Support policies: Western Digital offers a five-year warranty, unlimited toll-free technical support available 7:30 to 5 p.m. weekdays (Pacific time), as well as support through its own BBS and fax. The company's support policies are rated excellent.

Technical support: Each time we called for technical support we were quickly connected to a knowledgeable technician. Questions were answered correctly and quickly, although no extra advice was given. Technical support is rated satisfactory.

VALUE:

The Western Digital Ethercard Plus 16 costs \$349, less than the other NICs we tested in our April 16 comparison of Ethernet cards (Networks 2.15, and only \$4 more than the 8-bit 3Com Etherlink II. Its installation is slightly hampered by an excess of drivers from which to choose, but this does make for flexible installation options. Considering the product's exceptional speed, quality workmanship, and low price, we rate the Western Digital NIC an excellent value. □

The Ethercard is an exceptional performer, and costs less than any of the 16-bit network interface cards we have tested.

card Plus turned in transaction per minute (tpm) scores of 5.4 (installed in both server and workstations), and 5.3, (installed in just the server). These scores tie the best-performing cards from our product comparison, and earn the Ethercard a score of very good for transaction processing.

DOCUMENTATION:

The Ethercard's documentation contained adequate information to make finding and changing jumper settings on the card easy, but you need to print out the included README file to have enough information to correctly configure your cards. The manual contains a useful discussion of how memory is used in workstations and tips on designing a cabling layout. Documentation is rated good.

SETUP:

We didn't have to change any jumper settings on the boards for our installation, which represents a fairly typical network. The server drivers included with the card make it easy to install up to four Ethercards in one server.

Software installation for the workstations was another story. When you need to generate the Network driver in Novell's SNET program, you are presented with a bewildering list of options; there are drivers for different memory addresses, interrupts, and RAM buffer sizes. An included diagnostic program will help you choose which driver you need; we called technical support to be sure we got the right one. (We were able to get the card working without calling technical support, but it was not obvious to us which driver would give the best performance.) On balance, the Ethercard's setup is rated good.

SERVICEABILITY:

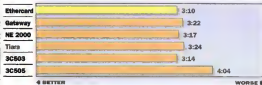
Workmanship: Most of the Ethercard's silicon and service-related—two capacitors are mounted close to the brackets and cable connectors, where

NETWORK INTERFACE CARD BENCHMARKS

INFO
WORLD

Heavy Office Test: Server Interface Cards

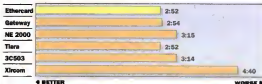
Indicated card used in server, 3Com 3C503 used in workstations. All times are minutes:seconds. Lower numbers indicate better performance.



Server card	Western Digital Ethercard	Gateway 16/Ethernet AT/AT-WS	Novell NE 2000	Tiara Lancelot/E AT	3Com 3C503 Ethercard Plus	3Com 3C505 Ethercard Plus
008 Copy	0:19	0:28	0:23	0:23	0:26	0:20
005 Xcopy	0:25	0:28	0:26	0:27	0:25	0:29
Word Perfect	1:00	0:56	0:57	0:58	0:57	1:02
Lotus 1-2-3	0:45	0:45	0:43	0:45	0:43	0:47
Paradox 3	0:45	0:42	0:44	0:51	0:42	1:29
Transaction processing	9:24	9:24	9:25	9:22	9:23	9:28
Transactions per minute	3.3	5.3	5.3	5.3	5.3	5.3

Heavy Office Test: Workstation/Server Interface Cards

Indicated card used in workstation and server.* All times are minutes:seconds. Lower numbers indicate better performance.



Server card	Western Digital Ethercard	Gateway 16/Ethernet AT/AT-WS	Novell NE 2000	Tiara Lancelot/E AT	3Com 3C503 Ethercard Plus	3Com 3C505 Ethercard Plus
008 Copy	0:17	0:21	0:21	0:17	0:26	0:38
005 Xcopy	0:21	0:21	0:25	0:19	0:26	0:47
Word Perfect	0:56	0:53	0:55	0:52	0:57	1:26
Lotus 1-2-3	0:40	0:42	0:40	0:45	0:43	0:50
Paradox 3	0:39	0:36	0:45	0:56	0:42	0:50
Transaction processing	9:17	9:17	9:16	9:16	9:23	11:41
Transactions per minute	5.4	5.4	5.4	5.0	5.3	3.3

*3C505 adapter tested with Western Digital Ethercard Plus in server.

REPORT CARD INFO
WORLD

ETHERNET NETWORK INTERFACE CARD

Western Digital
Ethercard Plus 16

Criteria	(Weighting)	Score
Performance		
Office test	(250)	Excellent
Transaction processing	(150)	Very Good
Documentation		
Setup	(150)	Good
Serviceability		
Workmanship	(50)	Excellent
Support policies	(25)	Excellent
Technical support	(25)	Satisfactory
Value	(250)	Excellent
Final score		8.8

PRODUCT SUMMARY

Company: Western Digital Corp., 2645 McCabe Way, Irvine, CA 92714; (800) NET-LEAD.
List Price: \$349.
Pros: Superior speed and workmanship; low cost.
Cons: Setup can be confusing; README file contains essential information not in manual.
Summary: The Ethercard Plus performed extremely well in our hardware-based tests. Considering its low price, it's a hard value to beat.

Target Showcase



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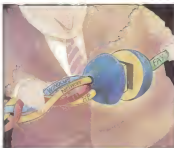
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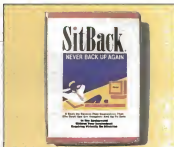
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PERSPECTIVES

International travelers are often amazed — and irritated — to find how broadly American culture has spread to other countries. Such icons as McDonald's, Levi's, and Pepsi can skip tourists anywhere from the Champs Elysees to the Giza.

Consumer products are not the only American staples to travel well. U.S.-produced software can be found in businesses in Hong Kong, Sao Paulo, and Tel Aviv. After years of investment, and sometimes token appreciation of foreign sales, U.S. publishers are finding that international sales are generating big bucks.

Publishers with overseas operations report international sales are growing faster than domestic sales. Industrywide, international sales account for some 34 percent of publishers' revenues, according to a recent study by the Software Publishers Association (SPA). But many corporations, such as Microsoft, report international sales are closer to half of their overall sales.

This trend is expected to continue for several reasons. First, with many product categories maturing, annual U.S. market growth has slowed from the 50 percent and better levels of the early 1980s to about 15 percent in 1989, according to SPA. At the same time, European and Japanese PC and software sales are booming, and are expected to grow rapidly as standards emerge and the European economy coalesces.

Second, economic and political developments worldwide are enabling more people and organizations to buy PCs and software. And finally, as corporations establish branch offices overseas, they often urge managers to use the same information processing tools that are used in their U.S. offices.

GEOGRAPHY 101. Selling software overseas involves more than just translating a manual. Consider that in England, dates are written with the day first, then the month, and decimal points and commas mean different things when dealing with large numbers. Conventions of style and business practices are also different, affecting grammar and spelling checkers, as well as form-letter templates.

U.S. publishers say that if they want to sell software in France or Germany, they also need to offer keyboard support for such symbols as unlaunts and European currency symbols. French typists use an AZERTY keyboard — not the QWERTY that is popular in the United States — adding to the customization needed, according to publishers.

These local issues, though, are relatively well known and easy to address, according to publishers. More difficult in the PC world, however, is selecting which hardware to support. For example, popular printers and monitors vary greatly from country to country. Internationalized software must provide drivers for all the printers, monitors, modems, faxes, and other peripherals used by local business people.

'MULTILOCAL.' To fully appreciate these issues, most publishers say it is critical to have offices in many regions. Microsoft — considered by many observers to be the most successful international publisher — has more than 20 subsidiaries, most of which are in Europe.



Software Spoken Here

*With the Home Market Slowing,
U.S. Publishers Enjoy Strong
Sales Overseas*

BY RACHEL PARKER

"Our company philosophy is that we are not a multinational, we are a multi-local," said Christopher F. Smith, vice president of international operations for Microsoft Corp. The Redmond, Washington, company hires local marketing, support, and administrative personnel and allows subsidiary managers a great deal of autonomy over their operations.

"If you saw the marketing promotions for Italy, the United Kingdom, and Germany, you would have no idea that they were from the same company," Smith said.

Appealing to the local market does not necessarily stop at the product. Many publishers with overseas experience have added different features for different local markets.

"You have to become an in-country supplier," said Stephen Crummeys, senior vice president of worldwide sales and service for Lotus Development Corp. If that means changing your core product, then do it, he added. "With 1-2-3/3 [the Japanese version of 1-2-3, introduced in 1986], we added features that the market wanted — radar charts, grid lines on the chart, changing the direction that the pie charts start on the screen."

Although Microsoft and Lotus have done very well internationally, they say that publishers who do not invest in blending into different local markets will fail.

"Right now, most companies are reactive," Crummeys said. "Many developers want to drive their overseas market by their needs, but that does not always fly," he said, pointing to U.S. car makers' lack of success in Japan. "The Japanese complain that we put the steering wheel on the left, that we have not been willing to change for them."

IF YOU CAN MAKE IT HERE. U.S. publishers say there is a very high demand for their products overseas — and little competition from local companies. If there is any competition in the market, it is often among U.S. companies — duplicating the market dynamics found in New York, Chicago, or Los Angeles. Although statistics are imprecise, U.S. software companies account for close to 70 percent of the worldwide market, according to Michael Porter of Harvard Business School, and author of *The Competitive Advantage of Nations*.

Why is U.S. software so pervasive? All of the product and country managers interviewed were quick to say that it is not for lack of creativity or intelligence worldwide. Programmers in Japan, France, and Germany — as well as the Eastern bloc countries — are just as able programmers as their U.S. counterparts.

Market factors, however, do play a role. "I would say that the United States is a uniquely good environment for creating innovative, good software products," Porter said.

U.S. publishers have a head start because many PCs were developed in and introduced to the United States before the rest of the world. Much of the programming done in Europe and Japan is either custom-built or for larger systems, Porter and others note. "The whole cycle got started much more slowly in other countries," Porter said.

When they go abroad, U.S. products are already fairly successful at home, generating significant resources to fi-

nance their expansion. By comparison, a French developer — even a wildly successful one — can only hope to generate a fraction of the sales at home.

The U.S. investment community has also contributed to the success of software companies overseas. In the early 1980s, venture capital and other financing entrepreneurs to start their own businesses. Similar backing for new ventures does not exist in many other countries, making it difficult for new companies — of any sort — to get started.

U.S. copyright law encourages entrepreneurs to finish their products and sell them commercially. In places where intellectual property is not protected, such as the East bloc or certain Asian countries, piracy is rampant. (Many publishers, including Borland International and Ashton-Tate, report that piracy has generated a well-established market presence for their products.) Because programmers know that programs are routinely copied, they have little incentive to polish their applications, a phenomenon Esther Dyson, editor of *Release 1.0*, calls "a world of beta versions."

LEVELING THE PLAYING FIELD. While U.S. companies dominate the world market today, the transition to new operating systems may provide a window to challenges in Europe, Asia, or Latin America. "Somewhere, there will be a disconnect, and we will see a boom," said Irfan Salim, vice president of international operations at Software Publishing Corp. "When that happens, all the players will have an even chance."

European developers are already trying to form partnerships to take products outside their own borders, Salim said.

Few foreign-developed programs have been very successful in the United States. The most famous products to reach the United States were all French: Borland's Turbo Prolog came over with founder Philippe Kahn from France in the early 1980s. Acius' Fourth Dimension database was introduced to the United States in part with encouragement from Apple. And a French developer, Aleph 2, has created several Lotus add-ins, including Impress.

Perhaps in a defensive move, U.S. publishers are also developing more relationships worldwide. Borland is setting up a technology center in Paris. Senior vice president of development Richard Schwartz will direct the center, which expects to hire French programmers to create future Borland products. The center will work closely with Borland's California headquarters on databases, spreadsheets, programming languages, and workgroup coordination.

Other publishers are on the lookout for foreign products as acquisition candidates. Lotus recently acquired rights to Impress, a 1-2-3 add-in that was developed in France and marketed in the United States by PC Publishing, in Santa Monica, California. The Impress developers are working with Lotus on integrating the product into 1-2-3, and will work as consultants to Lotus on an ongoing basis.

"One corporation just cannot come up with all the ideas these days," Crummey said. While Lotus plans to incorporate the Impress technology to its core 1-2-3 product, Crummey would not rule out acquiring a product simply to maintain it in a specific regional market.

APPLE OVERSEAS. While the PC and DOS are the undisputed standards worldwide, Apple has maintained a long-standing commitment to international sales. To help develop demand for the Mac over-

While the PC and DOS are the undisputed standards worldwide, Apple has a long-standing commitment to international sales.

seas, Apple offers a variety of marketing services to publishers taking applications to foreign markets. Apple has also "internationalized" the Mac operating system, so that programmers can translate their programs without touching source code.

Currently, the Mac operating system supports most European languages.

"In the romance languages, it is very easy... because the Mac thinks in terms of functionality, not language," said Bill Holtzman, general manager of the Pacific

region for Claris.

Asian languages, though, are another matter, particularly when dealing with a text-oriented application such as Mac Write, according to Holtzman. Whereas translations of Mac Draw and Mac Paint took only three or four months, Claris spent nearly two years translating Mac Write II for the Japanese market.

As part of its new push into Japan and other Asian markets, Apple is supporting more Asian languages — including Chinese and Korean. "The expectation is that the markets will open up in terms of the timing, currency, and copyright issues," Holtzman said.

[See Overseas, Page 49](#)

NOBODY DO LIKE WE D



This is what Microsoft® Windows® 3.0 looks like without a 512K Video Seven™ VGA card. Nice, but not as colorful or as sharp as it could be.

Appreciation of Cultural Differences Will Determine U.S. Success in Selling Software to Japan

Of all the world markets, software publishers believe that Japan will be the next big market.

Japan already generates more sales than any other nation for some publishers, second to the United States. As Japanese businesses move from dedicated word processors to PCs, the software market there has become the fastest growing major market in the world.

But selling to Japan requires a heightened appreciation of cultural differences, said product managers. The challenges begin with Japan's complex language and

multitiered distribution channel. Plus, Japanese have a very high regard for relationships, preferring to do business with people or companies they know very well.

Japanese incorporates four different alphabets, which may be mixed in a single document. To handle all those characters, the software must do a lot of from-end processing, said Bill Holtzman, general manager for the Pacific region at Claris Corp. Characters are typically written in 2-byte code (1-byte code is typical in the United States), and Japanese text is



Working with a Japanese partner, Claris spent two years translating Mac Write II.

vertically oriented.

"When you go to Asia, you have a different version of the product," said John O'Halloran, manager of Aldus Pacific Rim. There is a significant amount of engineering done by Aldus, both in Seattle and in Japan, he said.

While the cost of entry is high, publishers said they have found little if any resistance to their products in Japan. If anything, they reported that their products are welcomed as part of the Japanese government's efforts to encourage the local software market.

Which is not to say that U.S. publishers don't need to develop strong relationships with developers and distributors in Japan—to do business the Japanese way.

Those relationships can pay off. Microsoft has formed joint ventures with several Japanese companies to develop future software. "We won't see the results for three years or so. But there are a lot of very smart people out there with great ideas [for] technology that can be added to our technology," said Microsoft's Christopher F. Smith.

With Japanese ventures in place, some publishers are going even further east, to China and Korea. Aldus will release later this summer a Chinese version of PageMaker. "Once you do the Japanese translation, it is easy to do Chinese," said O'Halloran, who was in Tiananmen Square, in Beijing just days before the massacre in June 1989.

Aldus and other companies plan to sell their products through a Hong Kong distributor or subsidiary. Eventually, those operations may sell to the People's Republic of China.

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Overseas

Continued From Page 48

THERE AND BACK AGAIN. With the European economic community set to consolidate in 1992, and growth in the United States slowing, international expansion is likely to continue. And as nations industrialize, the PC is expected to become even more pervasive.

"Our view is that as countries industrialize, they will move to computers," said Microsoft's Smith. "And because PCs to us represent a far less expensive way to become computerized than a mainframe, we believe they will buy PCs," Smith said. "Each of these countries today that are relatively small represent significant long-term potential."

So what does all this international business mean for the average U.S. PC user? Look for new features—ones that you might not know you can use—coming from the publishers' international experience. For example, many of the features in 1-2-3, Release 2.2 were first implemented in 1-2-3/3J.

"It is safe to say that the functions in Mac Write II/J will show up in worldwide products eventually," Holtzman said. Currently, the Japanese version of the word processor has additional spacing controls to handle mixed sizes of type within a document, table support, and methods for handling short lines at the beginning of a column.

It also means that unless overseas publishers take advantage of the shift in operating systems and become successful quickly, the world software market will resemble more and more the U.S. software market, with just a handful of publishers dominating the market. □

As the Iron Curtain Swings Open, Software Companies Rush In to the Soviet Market

Pepsi, Ford, and McDonalds are newcomers to the Soviet Union. The PC software industry, on the other hand, has been there for years. Three years ago, Microsoft entered into a joint venture, called Dialog, to distribute programming languages and DOS to such Soviet agencies as the Academy of Sciences and Komaz, the Soviet truck manufacturer. In April, Bill Gates launched a Cyrillic version of DOS, and through Dialog, Microsoft is translating other programs as well.

The Soviet reception has been warm.

Close to 13,000 people jammed the Hall of Chandeliers in late 1988 for a PC software seminar led by Microsoft personnel, said Christopher F. Smith, vice president of international operations at Microsoft. Through Dialog, Microsoft was able to secure space for a "show-room" in Moscow.

With *glasnost* and *perestroika* opening the Iron Curtain, other companies are rushing into the Soviet market. In late 1986, Autodesk struck a joint venture agreement with Parallel to distribute Autocad in the Soviet Union. This year,

Nantucket Corp. opened a sales and support center in Moscow that sold about 700 copies of Clipper in its first two months of operation, the company said. Borland recently announced plans to serve the Soviet market through a joint venture called Interquadro.

"The Soviet Union market is about to explode," said Peter Alexander, executive vice president with Glav-PC, a consulting firm in Berkeley, California. "If [U.S. publishers] are not there, someone else will be, or Russian users will pirate [the software]. The government said that if

software is not sold in the Soviet Union, then it will pirate [the software]."

While the Soviet game Tetris has been a hit, Soviet users are looking for tools that will help the society automate.

"They are crying out to move into the 20th century," said Derek Gray, managing director of Aldus Europe, which recently completed a Cyrillic version of Pagemaker and is shipping copies to the Soviet Ministry of Printing. "Some of the printing industry is using a hot-metal printing technology that was there when the czars were."

"People doing the investment [in the Soviet Union] are going to want to assure that there are good accounting systems and controls to make sure that their investments are spent wisely," Smith said. "That says computers, and it says PCs because they are relatively inexpensive."

Selling software to the Soviet Union, however, is not a simple proposition. Currency, distribution, support, and marketing issues all can trip up the naive. Because it does not have a convertible currency, companies must accept alternatives to traditional payment programs.

One solution is to take payment in programming. Autodesk has a reciprocal deal with Soviet programmers, earning worldwide distribution rights to code written in the Soviet Union. Several programming tools and compilers have already resulted from the agreement, as well as a spreadsheet program that Autodesk sells in Europe.

By selling directly to the Soviet government, Aldus solves the currency and distribution issues. The government will distribute Pagemaker to various state agencies and will provide technical support. Aldus has flown Soviet PC specialists to Edinburgh for Pagemaker training so they can become super support specialists back in Moscow.

Marketing in the Soviet Union is also a challenge. "Savings money is not a concept that jumps to mind in the U.S.S.R.," said Aldus' Gray. Desktop publishing is a fairly foreign concept to a society that has kept the photocopiers under lock and key, he added.

While exciting, Glav-PC's Alexander and others warn that trading in the Soviet Union requires a great deal of time and energy.

"The idea that people can go in and plunder the Soviet Union, and not take something back, is incorrect," Gray said. "We spent a lot of time in there."

Still, Alexander encourages U.S. companies to try novel approaches to the market. "The misconception American publishers have is that they need to invest millions and millions before they see a return. Not true," he said. "There are ways to do clever things with smaller risk and see greater return."



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TO THE EDITOR

Manufacturing Tools Are In Place

Regarding Daniel Follette's article about PCs on the factory floor ("PCs Punch the Clock," May 21, Page 47), he is absolutely correct about the possibilities of PCs with multitasking, multiuser, network operating systems in a manufacturing environment. Unfortunately, like so many people, he feels that he must wait for OS/2 to become useful to see his dream fulfilled. Fortunately for us, all of OS/2's promise was delivered seven years ago by Digital Research's Concurrent DOS and its successor products.

Since the early '80s we have been installing systems that included the following features: PC-DOS compatibility, multitasking, multiuser, networking, process control, graphics, mainframe connectivity, bar-code interface, and environment hardened. This is accomplished using an IBM PC AT, AT or compatible in a NEMA-12 enclosure from Hoffman with Arcnet from SMC, C-DOS and DR-Net from DRI, Cobol from Ryan-McFarland, C from Microsoft, and process control hardware from Opto, Burr Brown, Metrabyte, and others. All of these pieces have been available to system integrators for several years.

Additionally, let's not overemphasize the competition between PCs and PLCs. This is like citing a competition between trucks and trains. While there are a few areas of overlap between their capabilities, they will work best when used together, like the use of computerized trucks in the piggyback area. PLCs work best at repetitive although possibly complex tasks. PCs work best when the task is to accomplished changes fre-

quently. Almost every manufacturing facility has both needs. Therefore, the best of both worlds is to have both on the plant floor in a way that allows a single management computer system to supervise or control both as necessary.

In short, the tools are already there. There is no excuse for VARs or systems integrators to hold back from the manufacturing arena.

Wicky L. Dabbs

President

Micro Services Group Inc.

Valley, AL

Forms Software Is Booming

I read with considerable interest your article of June 4 regarding forms software (Page 16), but can understand the basis for it given the somewhat unimpressive sales results of Delrina, Claris, and Adobe for forms software. These companies must be very disappointed. However, this should not give your readers the impression that, as your headline stated, "Forms Software Fails to Live Up to Industry Expectations." I encourage you to investigate the successes of other forms software publishers, including Formpipe.

The forms software industry is booming. Organizations of every shape and size are quickly realizing the enormous benefits of automating their form processing, especially form filling.

Formpipe alone, since 1988, has established a user base for forms that of Delrina's and well over 20 times that of the other publishers mentioned in your article. In addition, 1989 was a year of incredible growth for the PC forms soft-

ware industry, indicating that Dataquest is not accurately portraying the number of forms programs sold in 1989. The 105,000 copies of forms software sold in 1989 worldwide, as quoted by Dataquest, is at least 550,000 shy of the actual number for just North America.

By word processing or spreadsheet standards, this may be a relatively small number, but it shows the considerable money-saving opportunities for their companies. The popularity of form processing software will grow faster than any other PC application throughout the 1990s, and will become as common as word processing is today in 1995.

James H. Perkins

Executive Vice President

Formgen Corp.

Boston, Ontario

The Joke's on Us

Double-check Page 55 of the Autodesk article in your June 11 issue ("Leave Your Titles at the Door"). There's managerial wisdom quoted from "Kelvin Throop." You may not have enough *Analogue* readers on staff; he's been a running joke for years now.

Nell Pest

Chicago

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RESOURCES

• JUNE

25-28, Gaithersburg, MD: Compress '90, the Fifth Annual Conference on Computer Assurance: Systems Integrity, Software Safety and Process Security is sponsored by IEEE. Location: The National Institute of Standards and Technology. Contact: (301) 975-3340.

26-28, Beverly Hills, CA: Digital World is a new conference from Seybold Seminars that looks at digital use in consumer electronics, entertainment, and home computing. Location: Beverly Hills Hotel. For further information, contact: (213) 457-5850.

• JULY

8-12, San Francisco: Weingartner Publications' seventh annual Information Center Conference and Exposition for IC and MIS managers offers full-day workshops including technical training and networking. Locations: San Francisco Marriott and Moscone Center. Contact: (617) 542-0146.

11-13, Monterey, CA: BIS CAP International's 1990 3-D Computer Graphic Systems Conference includes sessions on three-dimensional tools and capabilities. Location: Doubtless Hotel. Contact: (617) 893-9130.

16-18, Boston: The Fourth Annual Engineering Workstations Conference is for technical managers, professional staff, and buyers in engineering and scientific

fields. Location: Hynes Convention Center. Contact: Angela Carter, (213) 450-0500.

17-19, New York: The Macintosh/New York Conference & Exposition is aimed at the corporate and professional user. Location: Jacob Javits Convention Center. For further information, contact: (617) 290-0400.

27-28, Irvine, CA: The American Cartridge Recycling Association and Environmental Dynamics present a conference on the latest advances in laser printer technology. Contact: (305) 539-0701.

29-August 3, Boston: The American Association for Artificial Intelligence's 1990 conference. For information, contact: (415) 328-3123.

• AUGUST

6-10, Dallas: Siggraph '90 presents its 17th international conference on computer graphics and interactive techniques. Contact: (312) 644-6610.

15-17, Boston: The Windows Conference and Exposition focuses on power computing in the '90s, using both Windows and OS/2. Location: World Trade Center. For information, contact: (415) 601-5000.

19-22, San Francisco: "Opening Windows to SQL" is the theme for the Gupta Developers Conference, which will fea-

ture four tracks: graphical applications, client/server computing, network cooperative processing, and reseller/customer relations. For further information, contact: (800) 767-2356.

20-24, Santa Cruz, CA: The Santa Cruz Operation will host SCO Forum '90, the International SCO Technology and Marketing Conference. Location: University of California, Santa Cruz. Contact: (408) 425-7222.

• SEPTEMBER

5-6, Washington: Fed Micro, FOSBE's conference and exposition for the federal government, features 250 vendors demonstrating advances in microcomputers, workstations, software, and peripherals. Contact: (800) 638-8510.

17-19, Long Beach, CA: The Presentations '90 Conference now includes a look at multimedia as well as graphics. It will focus heavily on desktop publishing. Location: Long Beach Convention Center. For further information, contact: (800) 262-3378.

InfoWorld welcomes notices of national conferences, trade shows, and meeting schedules of professional data processing, MIS, information center, and microcomputer management associations or support groups. Send notices to Resources, InfoWorld, 1060 Marsh Road, Suite C-200, Menlo Park, CA 94025. No local training or education seminars, please.

A USER'S VIEW • By JERRY POURNELLE



Without the Major Players, Comdex Was Just Lukewarm

Spring Comdex wasn't very exciting. I suppose that's a sign of a mature industry. Or per-

haps we're all getting a bit jaded. It might also have to do with neither IBM nor Apple nor Microsoft being there. One of the big events of the year was Windows 3.0, which sort of makes this the year of the graphical user interface; so when neither Microsoft nor Apple brings any new graphical stuff, it takes some of the excitement away.

Actually, I can't really complain anyway. There was more at spring Comdex than I had time to get to. While there may not have been any single spectacular item, I was able to collect quite a lot of solidly good stuff, improvements to this and that. The industry really is maturing, in that it generally can deliver what it promises.

The parties were nice, too: This year the Southeast Technical consortium managed to throw a better party than Silicon Northwest. As to what makes one party better than another—certainly the food has something to do with it, but in my book it's more important to provide room for the guests, and not to provide entertainment so loud that people can't talk. After all, the point of these things is to let people meet each other.

Just after we left Comdex I got a call from Gene Sumrell of Cheetah International: Cheetah and Northgate have signed a letter of intent; Northgate will acquire Cheetah. The Cheetah principals will become vice presidents of Northgate, and will continue to develop Cheetah technology. The result should be beneficial for us all: Cheetah has some of the best technology going and with Northgate's financial and distribution resources, Cheetah may yet get the market share it deserves.

Meanwhile, here's a sampling of the stuff that has accumulated here:

System Sleuth, Version 2.1 (Dariana Technology Group Inc., 7439 La Palma Ave., Suite 278, Buena Park, CA 90620; [714] 994-7400) is a distinct improvement on an already good product. Sleuth shows what's happening in your computer: which areas of memory are being used and for what; which I/O port addresses are in use; IRQ interrupt information; and just a whole lot more. The result is to make it a lot easier to install hardware boards, such as SCSI controllers, Bernoulli box, WORM or CD ROM drives, etc.

In addition to System Sleuth 2.1, you get some nifty utilities. There's a find file program that works across logical drives. If you're happy with DOS 4.0 or use Speedster to create one large logical disk drive, that may not be so important, but some of us still use DOS 3.1 and have large hard disks partitioned into a zillion logical drives—in my case it goes out to Drive O. I've more than once "lost" files and had to go searching through subdirectories to find them.

In addition to the file finder, there's a cleanup program that also works across logical drives. The utility will delete files according to your specifications, such as all BAK and TMP files.

You can live without System Sleuth and its utilities, but why would you want

to? Recommended.

The Mouse Pen (International Machine Control Systems Inc., 1332 Vendels Circle, Paso Robles, CA 93446; [805] 239-8976) is exactly what you infer from the name: a gizmo that looks and is used like a fountain pen, but which is a pointing device that replaces a mouse. Mouse Pen comes bundled with complete software for its use, and a pretty standard point program. It claims to be, and appar-

ently is, Microsoft Mouse compatible.

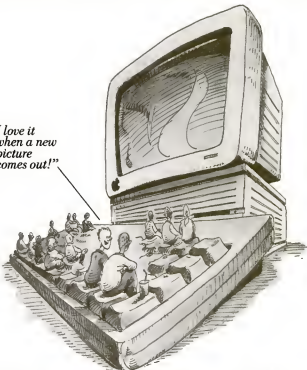
You'd have to use this thing to decide whether or not you'll like it. In any event it works.

Mouse Pen comes with a block of wood with a cutout that serves as a stand. On first encounter this seems like a good idea, but it doesn't wear well, or it didn't with me. Of course if you do use the holder, you won't ever have to go searching for the rodent through endless

stacks of paper.

Mouse Pen has a tiny plastic ball, unlike the larger rubber balls in other mice. As a result, the Mouse Pen works a lot better on a mouse pad than on a bare desk. Given a pad, it really is a lot like drawing, and I found the Mouse Pen simple and natural in use. On the other hand, I'm still using a Microsoft Dove Soap Bar mouse, which probably says more about me than about either product.

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Jerry Pournelle is a noted science fiction writer and computer columnist. The views expressed are his own.

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PRODUCT COMPARISON

Relational Power: Part II

InfoWorld looks at five multifile products with a range of strengths to link and manipulate your data.

BY NICHOLAS PETRELEY, CONTRIBUTING EDITOR
AND JUDY DUNCAN, REVIEW BOARD
WITH LINDA SLOVICK AND ZOREN BANAPOUR
TEST CENTER

In this product comparison we grade five relational databases on how well they handle the responsibilities of entering, querying, and reporting on your data. This is the second installment of a two-part look at multifile products in a single-user environment. (See Page 57 for a summary of the six products we reviewed in our first comparison, published January 8, Page 51.) Except for some minor tweaking, we use the same test criteria as we did in January. (See *How We Test*, Page 61.)

We chose the databases for this comparison based on results of a survey of 1,000 readers involved in using and purchasing databases. These products—Dataease, DataFlex, Dbxl, Rbase, and Smartware II—may represent one of the most eclectic groups of multifile databases we've ever compared.

Rbase 3.0 boasts a well-rounded design for both building applications and interactive use. It's also the only product here to offer the power of Structured Query Language (SQL) in an ANSI Level 2-compatible implementation. Unfortunately, Microrim seems to have ignored Ashton-Tate's Dbase history lesson and has released Rbase 3.0 before it is quite ready—though it adds some improvements and is not nearly as unstable as Dbase IV. Rbase has its share of bugs. On the bright side, Rbase 3.0 is not nearly as slow as we originally feared.

After finding it almost unusable in our June 11 stand-alone review because of poor speed, we made a minor modification to our benchmarks to see if Rbase's performance would improve (see sidebar "Indexes on Foreign Keys Crucial to Rbase 3.0's Complex Query Performance," Page 63). This comparison reflects boosted speed and value scores for Rbase 3.0 based on these new results.

At the other end of the spectrum, Dataflex, a for-developers-only multipatform program from Data Access, cannot be accused of a hasty upgrade—it hasn't seen any perceptible changes in years. Despite its drab interface, however, Dataflex is a solid product and one of the best performers.

Dataease 4.2, touted primarily as an easy-to-use interactive product, resides somewhere between the two extremes. This version offers noticeable improvements from previous versions, but Dataease is still quirky after all these years. It is basically a good product, evidenced by its capability of surviving in the market even with numerous ease-of-use glitches, but we won't be fully satisfied with Dataease until the edges are smoothed out and performance is boosted.

Wordtech Systems' Dbxl is the only Dbase-compatible product here and is priced at less than \$250—roughly a third of the cost of most of the others. A simple interpreter originally created to compete with Dbase III Plus, Dbxl is no fancy dancer, but it has some unique advantages, such as the availability of a companion compiler product.

Informix's Smartware II Database, a separately offered component of the Smartware II integrated software package, is the unexpected gem of the bunch. Though we're not sure of the interface, which makes it one of the most difficult-to-use products here, Smartware has the overall most polished feel. This version boasts the most dramatic improvements and gets the biggest boost in scoring.

Several of the products in this comparison are on the brink of updates or improvements that will have a major impact on value, according to the vendors. Perhaps the most significant is that many of the glitches we complain about in Rbase 3.0 will be mended in Version 3.1, due out in August, according to Microrim.

What just began handling (and not in time for inclusion in our review) at no extra charge Concentric Data's R&R Relational Report Writer, a much-needed addition. A version of Dataease that will translate the



program's query language commands into SQL will be available this summer as a front end for Microsoft-Sybase's SQL Server database server. Versions that will support Oracle and IBM servers and DB2 will follow, according to Dataease. An upcoming upgrade (Version 3.0) of Dataflex, whose outdated appearance we lament, will introduce a new graphical interface, according to Data Access.

We last reviewed Dataflex (Version 2.3) and Smartware II Database (Version 3.1) in our July 4, 1988, product comparison (Page 37). We devoted a stand-alone review to Rbase 3.0 in our June 11 issue (Page 87), which we recap in shorter form here, and looked at Version 2.11 in our January 8 comparison. We last looked at Dbxl (Version 1.2) in our April 18, 1988, comparison (Page 37) and Dataease (Version 4.0) in a May 15, 1989, stand-alone review (Page 76).

Nicholas Petreley is a contributing editor and test development specialist for InfoWorld. Judy Duncan owns Duncan Engineering, a California consulting firm specializing in custom multiuser databases.

Products Reviewed

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Executive Summary

Products with the highest profiles or the most comfortable laurels aren't always the best choice for reliable, quick database performance.

In this comparison of database products designed for a wide range of uses, the Smartware II Database pleasantly surprised us as the best overall offering, with vast improvements over its old version in speed, relational power, and cosmetic flexibility. It is still

a weaker product than many stand-alone relational database products, but not by much. The new features make it much better equipped to stand on its own, and make it worthy of consideration for developing solid relational database applications.

Though not as well-rounded as Smartware, Dataflex and Dbx1 also have some important capabilities.

Dataflex is strictly a database applications development environment — there

is no way to get around programming, nor would you want to if you picked this product. The learning curve for the language is steep, but well worth the investment. Dataflex is seriously lacking in up-to-date development tools, so Clarion is still our uncontested favorite for database applications development on the PC. Dataflex is almost as quick as Clarion, however, and wins hands down if running the same application in multiple environments is what you have in mind.

Dbx1 is the best deal for Dbase III Plus fans on a budget. Dbx1 is the only Dbase-compatible product in the group. It's reasonably quick alone and offers the added attraction of being usable with a companion compiler product (Wordtech's Quicksilver).

Rbase 3.0 is an outstanding blend of interactive SQL and SQL-based database applications development. As such, Rbase teeters on the brink of being a remarkable product. It's all the more of a shame, then, that this version suffers from poor memory management and a number of bugs that have not yet been addressed. Although it's not as dramatically unfinished as Dbase IV, the current Rbase needs some fine-tuning.

Our advice on this one is to wait until 3.1 comes out.

Dataflex is one of the quickest ways to develop simple relational applications.

Compared to similar products, though, Dataflex 4.2 still manages to fall short of the mark in numerous places. Its programming language is not as full-featured as Rbase's, for example; it is slow at anything but simple tasks; and it has a rough feel to it, often behaving like a product that was seemingly written by programmers who bit off more code than they could chew. With Dataflex, too, we prefer to cool our heels until the vendor can come up with an upgrade to take care of the problem areas.

BENCHMARKS

Single-User Relational Databases

	Database Version 4.2	Dataflex Version 2.3b	Dbx1 Version 1.3	Rbase Version 3.0	Smartware II Database Version 1.0
100,000-record ASCII file import	1:25:39	1:00:27	4:36	13:47	10:12
Create index	0:53	0:02	0:13	0:07	0:42
Indexed report	3:43	0:24	6:04	3:13	1:03
Select from one table	0:01	Immediate	0:01	0:01	0:02
Select from intersection of two tables	0:06	0:02	0:35	0:40	0:04
Select from intersection of three tables	32:14	0:04	7:11	8:18	0:17

System configuration: Compaq Deskpro 386/20e running at 20 MHz using a 40-megabyte hard disk and 4 megabytes of RAM.

Times shown in hours:minutes:seconds.

See "How We Tested and Scored Single-User Databases," Page 61, for description of tables used. Tables are 25, 1,000, and 5,000 records.

*Times shown are a retest of June 11 benchmarks using secondary indexes.

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REPORT CARD

Single-User Relational Databases

	(InfoWorld weighting)	(Your weighting)	Database Version 4.2	Dataflex Version 2.3b	Dbx1 Version 1.3	Rbase Version 3.0	Smartware II Database Version 1.0
List Price			\$750	\$695	\$249	\$795	\$449
Performance							
Relational data entry	(75)	()	Very Good	Excellent	Poor	Excellent	Very Good
Relational querying	(75)	()	Excellent	Very Good	Satisfactory	Very Good	Good
Relational reporting	(100)	()	Very Good	Excellent	Satisfactory	Excellent	Excellent
Programming language	(100)	()	Very Good	Good	Very Good	Excellent	Very Good
Speed of relational operations	(125)	()	Poor	Excellent	Good	Satisfactory	Excellent
Documentation	(100)	()	Good	Very Good	Very Good	Excellent	Very Good
Ease of learning	(50)	()	Excellent	Good	Very Good	Excellent	Satisfactory
Ease of use	(125)	()	Satisfactory	Satisfactory	Good	Very Good	Good
Error handling	(100)	()	Poor	Satisfactory	Good	Satisfactory	Very Good
Support							
Support policies	(25)	()	Very Good	Good	Good	Very Good	Good
Technical support	(50)	()	Poor	Satisfactory	Satisfactory	Satisfactory	Satisfactory
Value	(75)	()	Satisfactory	Satisfactory	Very Good	Good	Very Good
Final scores			5.8	7.1	6.0	7.7	7.5
Use your own weightings to calculate your score							

GUIDE TO REPORT CARD SCORES

InfoWorld reviews only finished, production versions of products, never beta test versions.

Products receive ratings ranging from unacceptable to excellent in various categories. Scores are derived by multiplying the weighting (in parentheses) of each criterion by its rating, where:

Excellent — 1.0 — Outstanding in all areas.

Very Good — 0.75 — Meets all essential criteria and offers significant advantages.

Good — 0.625 — Meets essential criteria and includes some special features.

Satisfactory — 0.5 — Meets essential criteria.

Poor — 0.25 — Falls short in essential areas.

Unacceptable or N/A — 0.0 — Fails to meet minimum standards or lacks this feature.

Scores are summed, divided by 100, and rounded down to one decimal place to yield the final score out of a maximum possible score of 1.0 (plus bonus). Products rated within 0.2 points of one another differ little. Weightings represent average relative importance to InfoWorld readers involved in purchasing and using this product category. You can customize the report card to your company's needs by using your own weightings to calculate the final score.

**INFO
WORLD**

Five Powerhouses Dominated January Lineup

Except for Dbase IV 1.0, whose innumerable anomalies continue to prevent us from recommending it, all of the products we reviewed in our first product comparison this year of single-user relational databases (January 8, Page 51) have a lot to offer, depending on your needs. The following is a brief summary.

Paradox was our highest scorer in January because of its capability of pleasing database novices and experts

alike. With its easy-to-learn interactive environment (including query-by-example) and robust development tools, Paradox can handle just about any database need, from the simplest data manipulation to complicated applications.

Clarion Professional Developer and Rbase were the next best offerings. Paradox gets you a leg up a little sooner, but Clarion produces more sophisticated database applications more quickly once you're over the learning curve. For pro-

fessional developers only, Clarion has the best set of tools for heavy-duty, data-heavy applications generation. It was also the single developer-only product capable of using Dbase data files directly (but it is not Dbase-language compatible).

What Rbase 2.11, the much more stable predecessor of Rbase 3.0, lacks in some of the extras you get in 3.0 (query-by-example, mouse-supported pull-down menu interface), it makes up for in reliable interactive and development cap-

abilities. Except for Paradox, Rbase racked up more excellent scores than any other product, including ease of use and ease of learning. Our only major complaint was that it was slowest at completing our two- and three-table joins.

Foxpro and Informix-SQL ran neck and neck in our scoring. Foxpro, the only completely Dbase-compatible product in the comparison, impressed us with its capability of doing almost everything Dbase does and better. It is fast and features, among a long list of improvements over Foxbase Plus, a mouse-driven windowing interface and a unique, almost-object-oriented forms designer and applications generator that offers a variety of flexible tools for robust development.

Informix-SQL was the only product in this group with true, industrial-strength SQL power, integrated into a set of tools for building relational database applications. With its mini-computer heritage, Informix-SQL is built for relational power — not ease of use, interactive use, attractive applications, or speed, unfortunately.

Though Dbase IV offers many enhancements over Dbase III Plus, an ever-lengthening list of bugs made it all but unusable in most of our scoring categories. There are too many easier alternatives, and Dbase IV is too unwieldy for us to recommend it for much more than a challenging scioco project for a Dbase enthusiast.

BENCHMARKS

Single-User Relational Databases

	Clarion Professional Developer Version 2.0	Dbase IV Version 1.0	Foxpro Version 1.0	Informix-SQL Version 2.10.06	Paradox Version 3.0	Rbase Version 2.11
100,000 ASCII file import	1:27:49	41:25	3:03	28:33	12:34	8:54
Create index	0:07	0:09	0:05	0:47	0:08	0:46
Indexed report	0:31	0:46	0:12	2:02	0:12	0:17
Select from one table	0:01	Immediate	Immediate	0:03	Immediate	Immediate
Select from intersection of two tables	0:01	0:26	Immediate	1:01	0:07 ¹	0:09 ¹
Select from intersection of three tables	0:04	4:39 ¹	0:22 ¹	2:44	0:50 ¹	6:46 ¹

System configuration: Compaq Deskpro 386/20e running at 20 MHz using a 40-megabyte hard disk and 4 megabytes of RAM. Times shown in hours:minutes:seconds.

See "How We Tested and Scored Single-User Databases" (Page 61) for description of tables used. Tables are 25, 1,000, and 5,000 records.

¹Times shown are a result of January 8 benchmarks designed to produce "distinct" results.

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REPORT CARD

Single-User Relational Databases

	(InfoWorld weighting)	(Your weighting)	Clarion Professional Developer Version 2.0	Dbase IV Version 1.0	Foxpro Version 1.0	Informix-SQL Version 2.10.06	Paradox Version 3.0	Rbase for DOS Version 2.11
List Prices			\$695	\$795	\$795	\$795	\$725	\$725
Performance								
Relational data entry	(75)	()	Excellent	Poor	Excellent	Very Good	Excellent	Excellent
Relational querying	(75)	()	Good	Poor	Good	Excellent	Excellent	Excellent
Relational reporting	(100)	()	Excellent	Very Good	Very Good	Very Good	Excellent	Excellent
Programming language	(100)	()	Excellent	Very Good	Very Good	Excellent	Excellent	Excellent
Speed of relational operations	(125)	()	Excellent	Good	Excellent	Satisfactory	Very Good	Satisfactory
Documentation	(100)	()	Very Good	Satisfactory	Excellent	Excellent	Excellent	Excellent
Ease of learning	(50)	()	Very Good	Poor	Good	Very Good	Excellent	Excellent
Ease of use	(125)	()	Excellent	Poor	Very Good	Good	Excellent	Excellent
Error handling	(100)	()	Excellent	Unacceptable	Satisfactory	Very Good	Excellent	Very Good
Support								
Support policies	(25)	()	Good	Good	Very Good	Satisfactory	Very Good	Satisfactory
Technical support	(50)	()	Good	Poor	Satisfactory	Very Good	Very Good	Very Good
Value	(75)	()	Excellent	Poor	Very Good	Very Good	Excellent	Excellent
Final scores			9.0	4.0	7.7	7.6	9.6	8.8

Use your own weightings to calculate your score.

GUIDE TO REPORT CARD SCORES

InfoWorld reviews only finished, production versions of products, never beta test versions.

Products receive ratings ranging from unacceptable to excellent in various categories. Scores are derived by multiplying the weighting (in parentheses) of each criterion by its rating, where:

Excellent = 1.0 — Outstanding in all areas.

Very Good = 0.75 — Meets all essential criteria and offers significant advantages.

Good = 0.625 — Meets essential criteria and includes some special features.

Satisfactory = 0.5 — Meets essential criteria.

Poor = 0.25 — Falls short in essential areas.

Unacceptable or N/A = 0.0 — Falls to meet minimum standards or lacks this feature.

Scores are summed, divided by 100, and rounded down to one decimal place to yield the final score out of a maximum possible score of 10. Products rated within 0.2 points of one another offer little. Weightings represent average relative importance to InfoWorld readers involved in purchasing and using this product category. You can customize the report card to your company's needs by using your own weightings to calculate the final score.

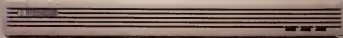
**INFO
WORLD**

When choosing
simply ask yo



Do I want a headache?

g an Ethernet LAN, yourself one question.



Or not?

The new HP EtherTwist Hub takes the pain out of networking.

Running a LAN over your phone lines should be easy. But the mess of cables on the left is the way most Ethernet LANs connect with your wiring closet: one cable for every PC.

Hewlett-Packard has a better way.

The HP EtherTwist Hub connects as many as 12 PCs into a LAN, using a single cable. When you're ready to grow, simply plug in another Hub.

That way, you can control your growth in easy 12 PC increments, instead of 120. Or instead of smaller hubs that still need one cable linking every single computer to the wiring closet.

Of course, the HP EtherTwist Hub complies with the 10Base-T standard,

and is compatible with Novell and LAN Manager. So call 1-800-752-0900, Ext. 1284 for more information on the HP EtherTwist LAN. You'll see how HP has turned a difficult choice into a very easy one.

There is a better way.



**HEWLETT
PACKARD**

Dbasease Version 4.2

A few years ago, when its simple relational capabilities and limited storage capacity compared well to competitors like Rapidfile and PFS:File, Dbasease was in its glory. When it graduated to a heftier relational design and greater data handling capacity in Version 4.0, Dbasease brought a unique simplicity to the world of multiple databases, even though it still had the feel of a more primitive product.

With Version 4.2, Dbasease adds some important new features. However, some ease-of-use and reliability problems that plagued Version 4.0 remain.

With this version Dbasease comes with two separate executable programs: one that uses expanded memory to manage and catalog, and another that can take advantage of up to 16 megabytes of extended memory.

Dataflex Version 2.3b

Dataflex, a collection of applications development tools that can be accessed from the DOS command line or through a menu system, is a stark relic among today's flashy, easy-to-use relational database packages. Few changes have been made to it over the last few years.

Dataflex is designed to be a generic developer's package — applications built with it are 100 percent portable across a variety of hardware and software platforms, including Unix, Xenix, OS/2, and several minicomputers. It may not be the most handsome, but Dataflex makes the most of what's got, which includes a run-time processor, a program compiler (tokenizer), a text editor, programs for creating data files and modifying their structure, an indexing tool, an import/export program; an ad hoc query processor; and a tool for adding your own commands to the Dataflex language. The development language is powerful, and Dataflex is one of the speediest data crunchers around.

A soon-to-be-released major update will bring Dataflex up to modern standards, according to the vendor. Version 3.0, due in July, will have a text-based graphical interface and more ease-of-use features.

Dhbl Version 1.3

Dhbl offers some features that are unique in the world of Dbase-compatible interpreters. The most prominent of these is the capability of creating graphs from your data files. With a few simple menu selections you can display information from up to 40 records in a pie, bar, step, line, scatter, or regression line graph. Dhbl also was the first Dbase-compatible product to provide text-based windowing support (followed by Dbase IV and Foxpro). You can define, display, and move up to 99 independent windows.

Most Dbase products offer either an interactive environment or compiler, but rarely both. You can use Dhbl with Quicksilver, Wordtech's separately sold companion line grapher, to develop, debug, and compile your applications, a convenience offered by few Dbase products. Wordtech also just began bundling Concentric Data's R&R Relational Report Writer (not available at the time of our review) with Dhbl, an addition that should alleviate some of Dhbl's report writing limitations. Here we look only at Dhbl.

PERFORMANCE: RELATIONAL DATA ENTRY

Data tables and data entry forms are created with the same utility in Dbasease. When you create a form, Dbasease creates the necessary data files and index files. This is a compact process that lets you define data files, data entry forms, data validation criteria, and index specifications all in one step.

After all the data files are created, relationships can be established to tie the files together. Dbasease has a variety of methods for entering data in multiple tables. You can embed in a main form a number of subforms, which will reference data in related files according to the relationships you establish. If you don't set up subforms, you can still reference related files during data entry in a handy, though visually unappealing, ad hoc fashion: When you press the appropriate key, the data entry screen will split, and a linked form will appear within the open space. You can also bring up a linked table as a list from which you choose an entry for the current file.

You enter the criteria for data validation when you create or edit the field on the form. You can have the form offer a list of predefined entries when you fill in a field. If you wish to browse through data via the data entry forms, you simply type the criteria you want Dbasease to use right into the data entry fields.

Dbasease allows you to set search criteria in a data entry form, and then view and edit a matching record in a table. The one thing Dbasease won't do is allow you to place formulas, even simple ones, in fields of the form. (You can place formulas in fields on the form as search criteria when using the query-by-example, or QBE, feature; however, you cannot edit the resulting records.)

Dbasease has added features to enhance data entry, and has cured many of the bugs that plagued it in our last review; however, there still are a number of loose ends, including problems caused by altering values in lookup fields (see ease of use category). **Score: Very Good.**

Dataflex data entry forms are created by editing a form description as a text file, much like Informix-SQL. You can get the Dataflex editor (but your own favorite editor will probably be more powerful).

The primary difference between Dataflex and Informix-SQL's form definition is that the form descriptions in Dataflex can be made far more complex. In one respect, they need to be more complex, because the data manipulation language is not as compact as SQL. But Dataflex lets you do much more within the form definition file — files generate a secondary data file from it, it can include numerous data entry options and programming instructions.

There are many options for performing on-screen calculations and validating data as it is entered. Field data entry can be restricted by specifying range checks, or data can be compared to a list of possible values. Even if you don't wish to write a program to control your form, Dataflex will write instructions to control finding, entering, modifying, and deleting data automatically.

We really like the interface used to find information by key. You simply place your cursor on a key field, type in the search criteria (or leave it blank), and then press the Find key. When you move to the next record, the displayed data will move in key order according to the key field where your cursor is located.

Applications menus are created much the same way as in Dbasease. You fill out a menu data entry form, specify the menu selection text, and then assign tasks to each menu selection. Like Dbasease, the menus are of the "what" type (the number of the selection) design.

Dataflex is anything but fancy, but being simple does not always mean being limited. Dataflex's menu module in Dataflex handles data entry with the best of them.

Score: Excellent.

For the most part, Dhbl matches piece for piece the facilities offered by Dbase III Plus. The one feature you don't get is the capability to draw menus and create the corresponding format files. (Format files are used to present a visually appealing screen design when the user adds or edits records in interactive mode.) Dhbl will use and support format files, but you will have to program the contents of the files by hand or use a third-party product to create them.

You can design a format file with a multidatabase view to browse related files. The contents of up to 10 related database files can be displayed. However, if a one-to-many relationship exists, only the first matching record will be displayed.

Format files can also update the contents of more than one file, but this type of use is not advised, as there are no controls to ensure that related files are updated properly.

Dhbl does not completely ignore screen creation. One utility allows you to create and modify window screen image files, and another command will retrieve the saved image and display it on the screen. However, this facility is most useful in programming and does not affect interactive data entry.

Dhbl's browse mode operates the same as it does in all the Dbase clones, with some added unique flair. The No Append command prevents you from adding records; No Modify disallows changes; and No Follow keeps the cursor in place when a record is reindexed (instead of allowing the cursor to follow the changed record).

Although all of its limitations can be overcome with programming, Dhbl has little to offer in interactive relational data entry. **Score: Poor.**

PERFORMANCE: RELATIONAL QUERYING

Dbasease handles querying with little trouble. Once you set up your relationships between tables, Dbasease pulls data from just about anywhere you like. Even if you do not have an established relationship, Dbasease can handle ad hoc relationships within queries, and can even lookup data in unrelated tables.

When it comes to viewing data in read-only fashion, Dbasease relies on its reporting features: You simply retype the output of the report to the screen, instead of the printer.

There are several different ways to build queries through reports. Dbasease's QBE mode allows you to fill out a table with a search specification and print the results to the screen or printer. For more complex queries, there's the Database Query Language (DQL). Results from DQL programs are also routed on-screen or printed. The formatting of data for viewing is more print-oriented than screen-oriented, but a little fudging here

Dbasease, Continued on Page 62

Dataflex has an ad hoc query module for the simplest queries to its data. This module lets you select the data files and fields to appear in the report, and lets you specify simple criteria for selecting data. Anything more complex than this must be programmed (although you can use the menu generator to build Paradox, Dbase, and Lotus 1-2-3 files, according to the vendor).

Programming complex queries using the Dataflex language is not always an easy task, because the language is complex and unique among PC database languages. Once learned, however, procedural languages such as Dataflex are capable of producing better performance

Dataflex, Continued on Page 62

Dhbl can perform queries through the menu-driven Intro module or in command mode. In the Intro module, you are limited to a single related file. You can specify a filter on the master file and choose fields to display from either the master or the related file.

In command mode, you can open and relate up to 10 database files. The Set Relation Additive command lets you relate more than one child file to a given parent file. The information displayed during a query is controlled by the Set Filter and Set Fields commands. The filter lets you specify the conditions that a record must meet to be included in a query. The fields specification controls which fields are displayed for any of the list commands. The Create Query command provides a menu-driven environment to specify filter conditions and save them in a file for later use. Once the files, relations, and filter are established, you can save the entire setup in a view file with the Create View From Environment command.

As with relational data entry, when a one-to-many relationship exists, only the first matching record will be displayed. **Dhbl, Continued on Page 62**

Rbase

Version 3.0

Historically a strong product that competes with Informix-SQL in SQL power, and with Paradox in PC interactive ease of use, Rbase adds many worthwhile new features with Version 3.0. Rbase now sports a fully ANSI Level 2-compatible SQL, a pull-down menu interface operable by mouse or keyboard, and a query-by-example (QBE) system. Otherwise, much of the glory of the original design is intact: Transaction processing is supported, and you still build tables, views, forms, reports, and applications pretty much the same way as before. Cross tabulations are possible, and the full range of what Micromin calls "super-math" functions are there.

Rbase is still rough around the edges—there are bugs, error handling is not up to par, and new screen requires 520K of free memory, up from 460K. However, Micromin promises quick fixes with Version 3.1, due out in August. This version will return memory requirements to approximately 460K and will remedy many of the other problems and bugs we mention here, according to the vendor.

PERFORMANCE: RELATIONAL DATA ENTRY

Rbase lets you edit single tables using the QBE module, but the best way to edit multiple tables through Rbase forms. The Rbase forms editor is not our favorite, but it is about the easiest way to get a combination of linked tables on-screen for editing. Even setting up one-to-many relationships is a breeze.

New to Rbase forms are pop-up submenus that allow you to select the data to be entered into a field. You go to the form field, press the proper key, and a menu will display some subset of the data for that column in the table you're preparing a SQL. Where clauses, the data will appear automatically. If you don't use the menu Where will prompt you to type in a Where clause to narrow the search before the data appears. These menus are not as flexible as we'd like; they don't allow you to define data that isn't already in the database. They are convenient, however, because they don't require any programming.

Editing data through Rbase forms has always entailed a step-difficulties of the cursor. Where clauses, the data will appear automatically. If you don't use the menu Where will prompt you to type in a Where clause to narrow the search before the data appears. These menus are not as flexible as we'd like; they don't allow you to define data that isn't already in the database. They are convenient, however, because they don't require any programming.

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All things considered, Rbase 3.0 still has all the data entry facilities of its predecessor. The new interface isn't as responsive, but at the same time there are a few additional goodies included in this version.

Score: Excellent.

PERFORMANCE: RELATIONAL QUERYING

Rbase offers a variety of ways to query data. First and foremost, there is the new SQL capability. If you know enough SQL to get started, Rbase will usually take up the slack, even on complex queries. For example, if you type the queries yourself, Rbase has a function to list the table and column names if you forget them, and then type the ones you want into the query or program. This is a valuable convenience feature.

Rbase continues to support read-only multitable views (a limitation of ANSI Level 2 SQL). Paradox stays one step ahead of Rbase in this respect by letting you combine multiple tables, edit the merged data, then redistribute the updates to the proper source tables.

Micromin has further improved its screen handling by including a new QBE system. The Browse function has been integrated into the QBE system. You can also format columns that appear in the browse table, and lock, resize, hide, and rearrange them.

The only thing you cannot do is save the layout once

Rbase, Continued on Page 63

Smartware II

Version 1.0

The Smartware II Database is one module excised from Informix's Smartware II integrated software package. (We last reviewed this package, which includes spreadsheet, word processor, communications, and programming language, August 14, 1989, Page 45.) The Smartware II Database (purchased separately) gives you the database module plus a simple text editor, the macro and programming languages, communications, and a few extra goodies (such as a calculator).

All of the products in this comparison, Smartware has grown the most since we last looked at it. Many of its inconveniences and severe limitations are gone. There are several new useful features, including some important relational capabilities. Smartware II handles memory management better than most of the other products compared here. It requires only 512K of RAM in a single-user configuration (though it performs better with 640K), and will take advantage of expanded memory.

Smartware lacks a true database applications language, and is still a little weak in its implementation of some of its relational capabilities, but it is a more refined and useful database product than ever before.

As with Dataease, you create the data file structure in Smartware by creating a form, and you specify the field validation and display criteria when you create the field. You can control the order of the fields at data entry.

Creating the data entry screen is a little convoluted when compared to most products, but this is mostly a side effect of the Smartware database being designed primarily for use in an integrated product environment. You have to go through a few more steps than usual to create a data entry screen, and a few extra steps to activate it.

There is a lot of flexibility for multiple data entry, though the methods for designing a screen are not very intuitive. Smartware is a multitwindow product, with each window containing a view of your data. A view can display data from one or more data files. You can place fields from multiple files in a single view and then link those files, or you can link a number of windows that are simultaneously on-screen, with each window containing its own view of data. Either way, the relationships can be one to one or one to many. A one-to-many relationship within a single view is cleaner than linking windows, since using a browse window for the "many" side will cause Smartware to display more data than you really want to see (you will see the related records, plus whatever follows those records).

Smartware now includes some features that add to data integrity control. You can define a rule for each field, which consists of a formula to check the contents of a field. You also can define a pop-up value selection menu for a field. This version has some additional cosmetic flexibility as well. For instance, you can set individual field colors, or paint all the fields at once.

Those who won't see as streamlined as it could be, we like Smartware's multiple data entry capability, and the new convenience features are helpful. Smartware has come a long way from its original score of poor.

Score: Very Good.

Smartware isn't the obvious product to pick for complex ad hoc queries, but much of the power is there if you are willing to uncover it. We created two- and three-table queries by opening a window for each table, linking the windows, and then constructing the queries as reports that used the relationships set by the linked windows. You can't use this technique anywhere else, but it works quite well.

Smartware also can perform union, intersection, nonintersection, and subtraction queries by placing the results of the queries in a new table. This more complex query process is somewhat confusing when compared to an easy-to-use product such as Paradox, but it can be mastered in time.

Smartware isn't without its occasional design glitch. When you perform a Relate command, Smartware often insists that you provide alternate names for duplicate field names in queries, even when there really is no obvious duplicate. The program has enough information

Smartware II Database, Continued on Page 63

HOW WE TEST

SINGLE-USER RELATIONAL DATABASES

All products in this comparison were benchmarked on a 20-MHz Compaq Deskpro 386 with a 40-megabyte hard disk and 4 megabytes of RAM.

Except for minor changes made to the speed tests, the products are graded using the criteria from our January 8 product comparison of single-user relational databases (Page 51). Weightings are derived from surveys of readers involved in buying and using relational database products.

We score all categories from the perspective of a corporate or independent database developer, rather than a casual user.

PERFORMANCE:

We break performance into five categories.

Relational data entry: To test the capability to enter data into more than one table at a time, we created a data entry form designed to enter data into two tables. All of the products tested are capable of such an operation, but some make it easier than others.

A product earns a satisfactory score if it requires only that you specify fields from various tables, and the links between the tables, when you create the form. Higher scores go to those that can easily handle both one-to-one and one-to-many relationships. In every case, the more the product distances the chore from the user without limiting the design, the better the score. We also considered the convenience of editing fields during data entry, including choices for cursor handling, data validation, correcting, and deleting. Also credited were screen painting features and the capability to decide in which order data should be entered in fields to be accessed.

Relational querying: This score rates the facility with which the product allows you to draw data from two or more tables. Most of the products we have reviewed offer query languages or fourth-generation query facilities, such as query-by-example (QBE), that help to make this operation easy. Such facilities earn bonuses in this category. Because of its power, flexibility, and completeness for building queries, we gave the highest score to where present, as does the capability to make SQL more usable. If the product is not interactive and lacks a query language, the usability of the programming language and associated tools for building queries is considered. Such languages must be powerful enough to support complex query operations, with an easy syntax that won't discourage programming.

Relational reporting: To test relational reporting, we generated reports drawing data from two related tables. Relational reports are usually created via a report painter or a report writer/language. If the product supports only a report writer, the language must have some advantage to justify the added burden of programming.

Programming language: We looked for a robust programming language capable of handling the demands of serious database applications. The full set of flow control statements (if...then, do...while) must be present, and higher scores go to those with appropriate built-in functions for math, string handling, statistics, date translation, and functions that report the state of various elements in the system. Bonus points go to those products with the best debugging and error-handling features. We also credit products that offer a compiler or tokenizer.

Speed of relational operations: Our speed tests reflect how well each product selects records from an increasingly complex chain of relations. In each language, we created three tables: a salesperson table of 25 records, a customer table of 1,000 records, and an order table of 5,000 records. We modeled our code on the queries below. (In each case, the results were sent to the screen; the time reported is time required to produce the complete result. All necessary indexes were created beforehand.)

Indexed report: Generate a report to the screen listing the names of sales representatives and their customers in alphabetical order.

Select from one table: List each sales representative's number and name in rep number order.

Select from intersection of two tables: List the number and name of each sales rep who represents a customer.

See How We Test, Page 63



In Database you can reference related files during data entry by splitting the screen to show a linked form.

Database
(Continued)

and there will produce attractive screen presentations of data.

Despite the occasional quirk and limitation (see Ease of Use) we still like the wide range of methods used to query data in Database. **Score: Excellent.**



Dataflex applications, such as this invoice form, are straightforward, with no pop-ups or scrolling lists.

Dataflex
(Continued)

than you can usually get from query languages.

Dataflex is strictly a developer's tool, so the score in this category is only minimally affected by the limitations of the ad hoc query processor. Dataflex may take more effort to program a complex query but, like Clarion, the results are worth the effort. **Score: Very Good.**



Dbxl's intro module prompts you through each step of an operation with a series of pull-down menus.

Dbxl
(Continued)

relationship exists, only the first record that matches the parent file's key field will be retrieved during a query. To obtain all of the detail records, you will have to turn the relationship around so that the file with many records for the same key is the parent and the file with a single record per key is the child.

The Dbase environment has never been very good for performing relational queries, and Dbxl hasn't done much to improve it. The interactive filter construction provided by Create Query is a useful aid, but its capabilities do not begin to compare to products like Paradox, Rbase, and Informit-SQL. **Score: Satisfactory.**

PERFORMANCE: RELATIONAL REPORTING

You can create a quick report on an ad hoc basis, or program a more complex report using the Database Query Language (DQL). Reporting is so closely tied to querying in Database that most of the criteria we use to score one can be applied to the other. The primary difference is the wider range of print formatting you get when sending the output of a query to a printer.

The Database language does not support the elimination of duplicate values in queries; however, you can trick the program into displaying your answers as "distinct." You do this by cutting out all of the normal "detail" field items that comprise a report. Instead, place the fields you want to view in the summary area (which Database calls the group trailer), normally used to display subtotals and the like for a group of records. This undocumented technique will get Database to print only one item for each set of duplicates.

Database does the job at reporting, though it is somewhat uneven. Sometimes it is extraordinarily easy to produce brilliant results, and sometimes you have to use extra ingenuity and effort (as with making query results distinct) just to get a simple report. **Score: Very Good.**

As in Database, Dataflex querying and reporting are so closely intertwined that it is difficult to separate the two. In fact, you create both complex queries (those that are not based on the ad hoc querying module) and complex reports the same way—as reports. The biggest difference is where you send the results: to the screen for queries and to a printer for reports. Reports also have more formatting options, of course, including Dataflex's version of headers and footers.

As Dataflex is a programmed report generator (using the report-writer approach as opposed to painting reports on-screen), there is little to limit the way a report will appear. If your text editor can draw lines, then you can place lines in your report. If you wish to include various break points with subtotals, you simply program them into the report. This method is a more tedious approach than you'll find in other interactive database systems, but it is very flexible and appropriate for a development environment. (Flexql will support on-screen formatting and subtotalling, including headers and footers, without programming, according to Data Access.) **Score: Excellent.**

Dbxl offers columnar reporting almost identical to that in Dbase III Plus. You can specify groups and subgroups with the choice of totaling numeric fields on group breaks. Data from up to 10 related database files can be presented. File relations and filters must be established external to the report definition. The user is responsible for restoring the appropriate file settings before running the report. As with relational querying, in order to get the detail records from a one-to-many relationship, you will need to make the file containing the detail records into the master for the report.

Report specification in Dbxl improves somewhat on Dbase III Plus; its on-screen diagram defines various parts of the report, such as group headers and how they will appear. Field placement is controlled solely by the specified column width. For anything more elaborate than a simple columnar report, you'll have to write a program or resort to third-party products (such as the R&R Relational Report Writer). **Score: Satisfactory.**

PERFORMANCE: PROGRAMMING LANGUAGE

The Database Query Language has been expanded in this version to include several new commands. It is more like a structured language than ever, though it still doesn't compare to most other database languages. It includes most control structures such as If...Then...Else, While, and Case, and can launch any module available in Database; however, it has some odd limitations. It is the only language we know of in which you cannot use an If statement to choose between working with records directly and launching another program.

Applications building is centered around filling out a set of data entry forms. Database will build menus from the information in these forms, and the menus will run various modules within Database, including data entry forms, queries, reports, and other DQL functions and procedures. You don't have much control over the look and feel of your application this way, but it is about the simplest means of building an application.

Database has a unique program editor that writes your code for you as you select menu options. Some of the bugs we found in the editor's automatic modes are gone, but there are still operational quirks (see Ease of Use).

The convenience of Database's method of creating applications combined with the expanded query language is enough to boost the score one grade. **Score: Very Good.**

Database, Continued on Page 65

Dataflex's programming language treads a middle ground of power and flexibility. Like the Database Query Language (DQL), it differs enough in concept from other database languages that you have to overcome a degree of prejudice before you can fully appreciate its power.

Dataflex is far more powerful and flexible than DQL; it's designed to be more of a programmer's database than an end-user package. However, when measured against today's standards of enormously powerful development and debugging utilities such as the ones provided with the latest releases of Clarion, Paradox, and Foxpro, Dataflex does not do nearly as well. Dataflex includes a wide range of string and math functions. It also includes very specific graphics commands for constructing your own graphs from the data. However, you cannot build cosmetics into Dataflex applications nearly as well as you can with most other database development systems. Its interactive debugging capability also is meager, limited to allowing you to set an option so that the line number is displayed as a program executes. Dataflex benefits from its auto-create utility, in which a simple application can be created from a forms definition file. **Score: Good.**

Dataflex, Continued on Page 66

Dbxl's programming language is where it really shines. There is no applications generator or template language, but Dbxl's implementation of Dbase is chock-full of seemingly minor enhancements that combine to create a language that's a pleasure to work with.

The windowing commands make elaborate screen manipulations a breeze. The Automenu features cut down on repetitive lines of code. In addition to Set Function To and Set Key To commands, Dbxl adds the unique Set Event and On Event commands. These let you specify a procedure that should be automatically implemented whenever the specified condition occurs. Writing code that interfaces smoothly to the hardware is facilitated by several commands of code. In addition to a DOS interrupt, directly load the machine registers, do bit testing, and input or output directly to an I/O port.

For debugging, Dbxl implements the standard Dbase Set Step, Set Echo, and Set History commands. The suspend, cancel, and ignore options that are offered at a break point are enhanced with a fix option that automatically calls the editor, loads the source file that is executing, and points to the current line. The Generate command eliminates the time-consuming chore of filling a database with test data.

Dbxl's programming language is a real pleasure, with surprising bonuses. **Score: Very Good.**

Dbxl, Continued on Page 66

The screenshot shows a window titled 'Rbase 3.0' with a menu bar (File, Edit, View, Query, Reports, Window, Help) and a toolbar. The main area displays a table with multiple columns and rows of data. The table has a header row with column names and several data rows below it. The interface appears to be a standard graphical user interface for a database application from the early 1990s.

Rbase 3.0 offers a "browse" view of data in its query-by-example system, but you cannot save the layout.

Rbase (Continued)

you're happy with it. If you know in advance how you want the table to appear, you can record your changes in a script, but replaying that script gets to be tedious when you have to run it every time you want to browse a table in the desired layout. (The capability to save a layout is a planned enhancement, according to Micromin.)

Also due to be fixed is a bug in Rbdefine that will sometimes abort your queries if you perform secondary indexes from that module. (See sidebar, this page.)

With the implementation of ANSI Level 2 SQL, Rbase has raised its query power one more step. The QBE module is a welcome addition, and except for the oversight in being able to save the layouts, we like using it. **Score: Very Good.**

PERFORMANCE: RELATIONAL REPORTING

The report module in Rbase 3.0 is for the most part unchanged, except for some additional features and a few corrections to the design. You can now produce "Quick reports" through the Reports Create and Modify menu, rather than having to wait until you're developing an application. Short versions of the reports can also be previewed on-screen or printed out before you print the full report.

One of the nicest enhancements is the new menu-selectable set of special printer effects. You can now create a report using all the special features of your printer, including italics, compression, boldface, and underlining.

Rbase continues to support variables and math functions within reports. Break points can be set, and information can be grouped according to need. Thanks to the new interface, most of the report functions are a little easier to access. Information about the database also is more accessible through the series of pop-up menus that list all of your data elements.

Score: Excellent.

PERFORMANCE: PROGRAMMING LANGUAGE

Rbase has a richer set of language extensions than any other SQL-based product for the PC that we know. This is because, unlike most other SQL-based products for the PC, Rbase started with the procedural language first, then added SQL. As the Rbase query language has always been similar to SQL anyway, this is an asset.

Like any comparable SQL implementation, Rbase 3.0 still has its own peculiarities. For example, when commands span more than one line (which most SQL commands do), each incomplete line must have a plus sign at the end.

Some of the holes in the Rbase language have been filled. Rbase 3.0 supports the "Switch...Case" structure, which replaces the cumbersome "If...Then...Else" structure.

We're still fond of Rbase's applications generator, which has been enhanced somewhat. More menu items are available, reports are better integrated, and at least one inconvenience has been ironed out — you can now rename a database on which an application has been based. (Previously, you could rename a database, but the application would neither recognize it nor run it.)

Overall, Rbase still rates as one of the best means of generating a relational database application.

Score: Excellent.

Rbase, Continued on Page 67

The screenshot shows a window titled 'Smartware II Database' with a menu bar (File, Edit, View, Query, Reports, Window, Help) and a toolbar. The main area displays a table with multiple columns and rows of data. The table has a header row with column names and several data rows below it. The interface appears to be a standard graphical user interface for a database application from the early 1990s.

Smartware II Database lets you link data entry windows in a one-to-many relationship.

Smartware II (Continued)

to skip this step, however, the designers simply chose not to use it. (Version 1.02, released during this comparison, fixes this problem, according to the vendor.)

We're not satisfied with every aspect of the Smartware interface when it comes to querying, but Informix has greatly expanded its query capabilities and power.

Score: Good.

Smartware has a good repertoire of report features for a module in an integrated package. The report can have a columnar or printed form type of format, or you can combine the two formats into one report. The combination approach is good for formats such as invoices, where you want addresses to appear in a formlike block and items listed in a columnar format with totals.

Smartware can handle multiple break points with sub-calculations with no trouble. A degree of font control and limited line drawing is also available.

You can create a multiple report based on linked windows when the order of the output data is driven by a field in the master window. If the driving field is in a slave window and it is the "one" side of a many-to-one relationship, you must use the Relate command (intersection, etc.) to create a temporary result table before running the report.

This version of Smartware employs handy reporting capabilities, the speed of which are all the more impressive in light of the extra steps you must often take.

Score: Excellent.

Smartware's Project Development Language (PDL) is actually an expanded script language with some surprising capabilities, such as being able to tap into DOS interrupts.

PDL is not a fine-tuned database application development language and it has limitations typical of a language with roots in an integrated environment (an exception to this rule is the Open Access integrated system, which includes a powerful development language). Nevertheless, you can program Smartware to do just about anything the competition can do, even if it requires a few detours where another language would offer a straight path.

You can record project files macro-style, or by coding them longhand into a text file, or by using some combination of the two techniques.

Programs written in PDL are compiled to a tokenized form before running, which may explain Smartware's speedy execution. **Score: Very Good.**

Smartware II Database, Continued on Page 67

How We Test

Continued From Page 61

Select from intersection of three tables: List the number and name of each sales rep representing a customer who currently has an order on file.

Our benchmark table also includes the times for creating indexes and executing the necessary ASCII import into our 100,000-record file.

Each query was phrased in natural order (approximately as described above), rather than in the order that would obtain the quickest results. We did not index link files for any of the products unless it was required to perform other queries that would be creating temporary indexes. We made an exception to our rule only for Rbase.

See How We Test, Page 67

Indexes on Foreign Keys Crucial to Rbase 3.0's Complex Query Performance

InfoWorld's benchmark tests for database products are designed to test how well a wide range of products performs a battery of standard setup and relational query operations. For consistency, each product is tested with identical benchmarks. As such, the tests — although indicative of a product's general capabilities — do not necessarily produce the best speed of which a program is capable. Occasionally, as happened with Rbase 3.0, this results in some surprising benchmark times.

In this and our January 8 comparison, we set out to test all of the products with benchmark tables indexed only on the primary key fields. We chose not to perform secondary indexes (also known as indexing the foreign keys — the fields in the files to be linked), although such indexes usually speed up a product's performance. A handful of products wound up with secondary indexes anyway. Some, such as Dataflex, would not perform our three-table query until both fields were indexed. We suspect that some of the other products (such as Informix-SQL and Paradox, with its query-by-example module) created temporary indexes on the foreign keys. Rbase 2.11, part of the January 8 comparison, did not require or use secondary indexes, but still performed within acceptable limits (about seven minutes to complete a three-table intersection).

When we tested Rbase 3.0 for our stand-alone review (June 11) and for inclusion in this comparison, we once again omitted secondary indexes (although the Rbase 3.0 reference manual does recommend them). To test 3.0 we were able to bypass the use of a "view" (required with 2.11) and use Rbase's ANSI-standard SQL Select statement to create the same query syntax that we had used earlier for Informix-SQL. This time, however, Rbase 3.0 had a serious problem performing the same three-table intersection with which 2.11 had little trouble. It took over two hours to complete it, an extreme slowdown that Micromin has since attributed to an optimizing problem in Version 3.0. As a result, for this product comparison we tried indexing our foreign keys for Rbase to see if it would make a difference. It did: Rbase came alive, performing the three-table join in a little more than eight minutes.

Rbase 3.0 apparently appreciates manually created secondary indexes. Even so, we experienced some difficulties this time as well, according to Micromin. The optimizer will be tuned so secondary indexes will be as unnecessary to run joins in a reasonable amount of time as they were in Version 2.11. Should you still want to use a secondary index, Rbase 3.1 will let you do it from within Rbdefine as well as the command line, according to the vendor.

— Nicholas Petrely

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Database
(continued)Dataflex
(continued)Dbase
(continued)

PERFORMANCE: SPEED OF RELATIONAL OPERATIONS

Overall, Database was the slowest product here, taking more than half an hour to complete a three-table intersection. It's not quite as slow as Dbase at the indexed report, but it was the slowest in this group of products at importing our 100,000-record ASCII file and creating an index.

Database performs the simplest queries quickly, but it's far too slow when accessing more than two files.

Score: Poor.

Except for a sluggish import, Dataflex was the quickest product in this comparison. It performs almost identically to Clarion — not surprising, as both are development products designed for efficiency through programming. Such programming allows for finer tuning of operations than SQL statements, for example, because even an optimizing SQL engine can make far fewer intelligent decisions than a skilled programmer.

Dataflex processed our three-table intersection in just four seconds, as lightning fast as Clarion.

Score: Excellent.

Dbase is a middle-of-the-road performer in our benchmark tests. It was the slowest of the products at creating an indexed report, and turned in midrange times for the two- and three-table intersections, but it blazed through the 100,000-record ASCII file in less than five minutes.

Score: Good.

DOCUMENTATION

The documentation is laid out logically, and if you're using Database for simple office applications, you probably won't have any difficulties in finding what you need. As Database becomes a moderately powerful relational tool, however, the complex portions of the product are more likely to get used, and these features are not as well documented as the basic operations. For instance, we could find nothing in the documentation to help us construct our three-table benchmark query. Also missing is how to tweak Database into giving distinct query results. The documentation claims incorrectly that Database will convert the layout of a Paradox form to a Database form.

If you're using Database for larger or more complex jobs, the documentation falls short. **Score: Good.**

Documentation consists of two primer manuals, a user's manual, an encyclopedia of commands, a quick-reference card, and key overlays (which are necessary since Dataflex refers to keys by their function in order to be consistent across a wide variety of platforms). Documentation is complete, but not always presented in a consistent, easy-to-follow manner. There are times when you really have to dig to find what you need.

Once you get past the primer, hard-core programmers will be the ones to benefit most from the Dataflex style of documentation. The encyclopedia is as thorough a dictionary of commands as we could imagine.

Score: Very Good.

Dbase's documentation is one large volume, broken into sections by tabbed dividers. The material is presented in clear, concise language and the organization is outstanding. The introduction and tutorial serve to get the beginner going. The reference, command, and function sections contain all the meat for the experienced user. The index is outstanding, an all-too-rare occurrence in software documentation. Your use of the manual will be reduced once you discover how complete the on-line help manual and help system is. **Score: Very Good.**

EASE OF LEARNING

For the most part, Database is a cinch to learn, and it has gotten easier as it has grown. There is a good tutorial manual that teaches you the basic moves, and a fancy demonstration program to show off what you can do with Database.

The most difficult part of learning Database is picking up the syntax of DQL. Many casual users can get away with using Database without ever having to deal with DQL. However, those who want to put together applications will need to learn the various tricks you need to play in order to get Database to perform much like other packages.

Overall, however, Database continues to be a product with which you can master the basics in a minimum of time. **Score: Excellent.**

Many aspects of Dataflex can be learned quickly. Most of the features that control data entry are intuitive and will require little effort to get used to. However, the Dataflex language is uniquely unique in concept that even good PC programmers will find it a challenge.

The Dataflex primer comes in two parts, both of which are very useful for getting your feet wet. Sample applications also are a valuable boost. However, once you get past the basics, you're left with a lot of learning to do, and not as much as in the way of help.

Overall, Dataflex takes in the steepest effort to make it easy to get started, and helps you with sample applications once you begin programming more complex applications. **Score: Good.**

Dbase has always required a long haul for novices trying to learn what a database is and how to use the commands at the same time. Dbase provides a friendly interactive environment for new users. The Intro module is a tremendous improvement over the Assist command in Dbase III Plus, offering a layout and prompts that are much more intuitive.

Once you're past the capabilities of Intro, you're faced with Dbase's version of the dot prompt. You can configure the prompt in a manner similar to the DOS prompt, but in its default form, the prompt displays the current work area and file name if one is open. Dbase's excellent help system and on-line manual are a big help here. The tutorial in the manual not only takes you through general interactive use, it includes an extensive discussion of programming. **Score: Very Good.**

EASE OF USE

Database remains one of the easiest products for building a simple relational application — in concept. If you interact with it on a daily basis you will find it is still beset with quirks. First of all, the interface is simply too rigid. Database may be the only product in which the table view will not scroll data one line at a time. The forms editor cannot perform true block cut-and-paste. Also, Database does not allow for piecemeal work. If you try to leave an incomplete or incorrect program with the intention of coming back to it, Database will refuse to let you exit or will discard your incomplete work, unless you take the time and trouble to "comment off" each line.

If your relationships between data files are at all complex, Database can behave unpredictably. For example, if an ad hoc subform (related file) is related by a lookup field in the main form, Database will not find the correct record in the ad hoc form if you make a change that alters the value in the lookup field. The only solution we found to this was using the multitasker option Auto-Refresh.

The DQL program editor could be less quirky. If you reposition the cursor, it can get confused about syntax and write unwanted instructions over existing code.

As much as we like the basic Database concepts, the little problems that need to be cleaned up prevent us from rating it any higher. **Score: Satisfactory.**

Database, Continued on Page 68

While other products have grown, Dataflex has stood relatively still over the years. Its menu interface was showing its age two years ago and is primitive by today's standards. If you press the Up arrow too many times in a menu, the menu selection bar disappears instead of scrolling to the last selection. When Dataflex prompts you for a file name, you must remember the name, as there is no list of files from which to choose at that point. You almost never get to choose fields or file names from menus; you usually refer to these items by number, a list of which is not always available when you need it. The closest Dataflex's user interface comes to this level of ease of use is inside the ad hoc query program, where most things are menu-selected.

Dataflex is easy to use for the most part when it comes to applications development. Some steps in the development process can be automated; for instance, Dataflex will auto-create data files and basic data entry programs from forms you draw with any text editor.

Most of the operational features in Dataflex are almost void of ease-of-use features in concept (Version 3.0 will offer lists and other ease-of-use features throughout the program, according to the vendor), yet Dataflex makes certain important applications design steps very simple. **Score: Satisfactory.**

Dataflex, Continued on Page 68

Dbase is a command-driven product for the most part, waiting patiently at the prompt for your directions. The Intro, query, report, label, and graph modules are menu-driven with easy-to-use pull-down menus, but the rest of the time you need to know what you're doing. You can get guidance at any time from the help and on-line manual by pressing the F1 key.

The History buffer records commands as they are issued. You can recall previous commands without typing by simply pressing the up arrow keys. After recalling a command, you can edit its contents before pressing Enter to reissue it. The Intro program allows you to record a series of menu selections into a macro. In command mode you can store frequently used commands to a function key.

Dbase lets you store multiple images (such as windows you point on-screen) in one handy library file. We also like the way Dbase handles memo fields: Instead of requiring you to go into a full-screen editor to edit a memo field, Dbase lets you store its contents to an array of strings. This enables you to use the same reusable string handling and validation routines with a memo field, and lets you develop creative editing alternatives, such as reading the strings in a pop-up window. **Score: Good.**

Dbase, Continued on Page 68

Rbase
(Continued)Smartware II
(Continued)

PERFORMANCE: SPEED

Provided with secondary indexes on two of our test tables (see sidebar, Page 63), Rbase 3.0 makes a vast improvement over benchmark times we reported in our recent stand-alone tests. Its two- and three-table results now stand at 40 seconds and 8 minutes, respectively, compared to the old times of 3 minutes and over 2 hours.) Though we wish Rbase 3.0 handled secondary indexes differently (either automatically creating them or not depending so heavily on them for speed), the steps one must take to implement them are not onerous.

Score: Satisfactory.

DOCUMENTATION

The Rbase manuals are still top-notch, and have improved even over the previous version. Documentation is composed primarily of two large manuals: a user's manual and a reference guide. A smaller introduction manual and an installation guide also are included. An *Rbase for Users* guide is included in upgrade packages of Rbase 3.0; in addition, you get a quick-reference guide.

Rbase also includes the first part of an on-line, three-part tutorial written by American Training International (the other two installments are available at an extra cost). The 187-page introduction manual features five tutorial lessons.

All of the manuals are well written and thorough. There is little Rbase could do to improve its documentation. **Score: Excellent.**

EASE OF LEARNING

Rbase's on-line tutorial serves as a fairly complete learning aid. If you're computer literate, you can skip the tutorials and begin working with the sample exercises in the user's manual. All of the manuals are so well written that they are good tutorials in themselves.

Rbase users and SQL buffs will have no problem at all adapting to this new version. The transition from the older, more limited syntax to this adaptation of ANSI Level 2 SQL should be painless, since the SQL command set is a natural extension of the original Rbase language.

Version 3.0 also brings some welcome improvements to Rbase's help system. There is a better help index, with hypertextlike menus providing deeper degrees of information. Help is available at the R: prompt or inside the program for context-sensitive assistance.

Score: Excellent.

EASE OF USE

Rbase's new menu interface lags behind your selections, most noticeably when you use the mouse. Like Paradox, Rbase requires you to remember path names; there is no disk navigation system. (The next version of Rbase will correct both of these problems, according to Microm.)

Regardless of where you are in Rbase, you can use the F3 key to pop up lists of data elements, a valuable new convenience feature. This alone provides a good reminder of the database structure when you need it; Rbase also lets you use the menus to save typing.

You can now get a context-sensitive list of the valid keystrokes in your current operating mode. Data tables, tables, columns, and the rest of the database elements in Rbase appear as menu selections when appropriate. Unfortunately, this selection technique imposes limits on the usefulness of Rbase's scripting capability. Scripts in Rbase record only keystrokes, and because data elements are in the menus, the keystrokes you use to select any given element will change frequently. If a script picks the wrong element, it could wreck havoc.

Though it has grown and improved in many respects, Rbase has become more tedious to use, due primarily to its lack of responsiveness. For this reason, we drop its score for ease of use. **Score: Very Good.**

Rbase, Continued on Page 69

Despite being the oddball product in this comparison, Smartware made an impressive showing in our benchmark tests. Our two-table indexed report required a temporary table was driven by (because the order of the data displayed was driven by a field in a secondary table, not the master); however, this had little effect on performance, since Smartware clocked in as one of the fastest products in this test. It performed the three-table intersection in only 17 seconds, once we programmed in a velocity number that would scroll results to the screen as quickly as possible. **Score: Excellent.**

The Smartware documentation has improved significantly since our last review. It consists of nine manuals in all, including one for the database, project programming (programing), software system (user's manual), formula reference, communications guide, installation guide, quick reference, and a pamphlet on the appointment manager. There is an update guide as well.

An on-line tutorial to the form of a script-driven program can be run from within Smartware. There is now a multilevel help index and on-line table of contents, which resolves our main complaint. There are better examples of how to perform tasks. If you are going to tackle a full-blown application, the Smartware manuals still come in handy. For light to moderate database use, however, the documentation serves its purpose.

Score: Very Good.

The mere fact that Smartware is menu driven does little to aid you in learning or using it. Smartware ranks behind only Knowledgebase as the product with the most inefficient and unintuitive menu system we have ever seen. For example, should you choose to go through the menus to position the record pointer, you will find yourself hunting through the selections Data, Goto, Record, and Record-Number, after which you type the record number and press Enter. Fortunately, there usually are other ways (Goto, for example) available to bypass such odd paths in the menu tree.

The help screens have improved since our last look, with the addition of a help index. Smartware's documentation aids the learning process, and the on-line tutorial is a good way to master the basics. ("You'll have to run it from the beginning, because it isn't obvious how to move around within the tutorial if you jump in at the middle.") Although it's not an on-line version of the manual, on-line help contains just about everything in the manuals.

The unintuitive nature of many of the operations can impede learning, and though features have been added to make this version of Smartware easier to learn, this is balanced by the fact that Smartware is now more robust with more features to master. **Score: Satisfactory.**

Like Database, Smartware suffers from a few minor ease-of-use problems, but most of them stem from the design of the interface. For example, keyboard operation can be inconsistent — of five places where you can point to a selection, the available keys to do so are all different.

You will want to use macros (or scripting) if you regularly perform queries in Smartware that create what you want to be a temporary table. Unlike Paradox, Smartware does not support automatically created and deleted temporary answer tables, so you must delete an old table each time you begin a fresh query.

Although Smartware handles many more intelligently than Rbase, in addition to being able to save the keystrokes, you can save the actual instructions that result from the keystrokes (such as the name of the file selected). This allows you to perform operations any way you choose without fearing that the keystrokes will have a different meaning if the list of files changes.

Overall, Smartware offers some nice features for designing data entry screens, including automatic assignment of field labels. Smartware successfully overcomes many of the problems of the complex menu structure by offering alternative keystrokes. Overall the package has improved, but the interface still could be easier to use. **Score: Good.**

Smartware II Database, Continued on Page 69

How We Test

Continued From Page 63

3.0, which does not require secondary indexes but will not perform reasonably without them. (See sidebar, Page 63.)

For this comparison we retested the three-table intersection times of four of the databases we reviewed in our January comparison (Dbase, Foxpro, Paradox, and Rbase 2.11) and two-table times for Paradox and Rbase in order to show more realistic "distinct" results. The new times are included in the benchmark table on Page 57.

The Distinct command in SQL (or its equivalent in other languages) limits query results to one instance of an answer, eliminating duplicate information. For instance, by making our three-table query distinct we are able to produce results listing the name of each sales representative only once — instead of repeating the rep's name as many times as there are sales.

See How We Test, Page 69

Interface Shells May Add Unnecessary Steps

When you use a database product interactively, you find yourself either typing a series of commands at a prompt, or navigating through menus and other visual interfaces as the checkmark query-by-example systems in Paradox and Rbase. Some products offer both methods of operation, others only one.

Some products that once supported only the command line in earlier versions, such as Foxpro, Dbase, and Rbase, now include a visual user interface. However, instead of integrating their interfaces directly into the database, many of these products use "shells" (Ashton-Tate calls them surfaces).

A visual interface is a shell when it works as a program that runs on top of the command-line product. When you make a selection from a menu that is part of a shell, a number of steps usually have to take place before the program can execute your request. Instead of typing a command and hitting the command syntax from the selection, then the command's syntax is reinterpreted by the internal command line interpreter into the operation.

In most cases, such duplication of effort is wasteful; turning menu operations into written commands first gains you nothing over a product whose menu is tied directly to internal operations. Imagine having to pause to translate in your mind each word in a Spanish sentence into English (case into house, for example) before being able to understand the complete sentence.

In an integrated interface, commands or selections are directly connected to the internal operations that display the results. To Paradox, for example, you just pick "view" and a table name from the menu; the program goes directly to the internal operations that display the data table. As a result, onshell products such as Paradox tend to respond more quickly to requests than products with shells. And when query requests get more complex, products such as Paradox usually continue to respond quickly, whereas shell-based products get even more bogged down in the middle steps.

Careful design can minimize this delay, however. For example, although the query-by-example (QBE) modules in both Rbase and Dbase are a part of shells, the delay in Rbase is much less noticeable because its QBE generates compact, behind-the-scenes SQL statements, whereas shell-based products usually create a small program (as much as 25 lines for the simple two-table join), which it then interprets and runs.

Why do developers implement shells? Vendors of some products that let you use commands as they're being built, such as Foxpro, cite instructional value — the shell acts as a tutor of sorts in the database language. Of the three products compared here, however, Rbase has the best reason for using a shell. Planned for eventual use as a front end to Microm's client/server database engine, Vanguard, Rbase's QBE system will have to generate SQL statements in order to pass query requests to the server.

— Nicholas Petrickey

Database (Continued)

Database adds important new relational integrity options in this version: Null, Restrict, and Cascade, which control the effects on data when you make a change to a parent record in a parent/child form relationship. On the down side, which is pretty steep, Database often lets you make grouping errors that could be easily trapped or prevented. For example, if you change a field's data type from string to numeric, but you neglect to define the kind of number you want (integer, floating, or fixed point), it will let you save this incomplete field type and even the form. Saving the form in this state destroys all your data for that field because it creates a damaged field in its place.

Database rebuilds indexes when you run a process called "reorganizing a form." For the most part, Database will reorganize a form automatically when you change its structure. The program is not consistent, however. Database often executes the lengthy process of index rebuilding when it is not necessary, or conversely, neglects to rebuild index files when it should.

Database is inconsistent in the way it is designed to handle operational errors — severely limiting your actions at one moment, the next moment allowing you to make serious mistakes without so much as a warning. **Score: Poor.**

Database provides unlimited free support over a non-toll-free line, private electronic bulletin board service, and fax. There are also extended support hours (9 a.m. to 8 p.m. Eastern time) and corporate extended support plans. **Score: Very Good.**

After encountering several busy signals, we got through to Database technical support, only to wait on hold — with the receptionist checking on us every few minutes — for half an hour before leaving a message. We received a callback within the hour. Support personnel were eager to help — researching questions while we waited on hold — but we were given one inaccurate answer. **Score: Poor.**

As other relational database products break into a gallop, Database continues to lumber along, resistant to change. Database is a terrific idea, but it suffers from a number of glitches, design flaws, and oversights, most of which are minor. The real mystery is why so many simple oversights remain unchanged version after version.

Quirks aside, the biggest drawback is Database's lack of speed when used with multiple files. We do not recommend it for manipulating large quantities of data, or even using moderate amounts of data in a complex way.

At \$750, Database remains an uneven product with a lot of unfulfilled potential. However, if your needs are light, you don't mind a few annoyances in the design, and you want one of the simplest means of building a multiple application, Database is a viable choice.

Score: Satisfactory.

Dataflex (Continued)

ERROR HANDLING

Dataflex has a reindexing utility, DIndex, that will delete or extract any damaged records in a database when you reindex.

Dataflex is notably missing several features that one takes for granted in most currently available software, such as transaction processing with rollback, and many common security features.

Dataflex has a small degree of password protection, but not the kind of field and file protection found in most packages.

The inclusion of the file repair utility helps the score in error handling, as does the fact that Dataflex did a fine job of trapping errors for us. **Score: Satisfactory.**

Dbxl (Continued)

Dbxl does an adequate job of preventing accidental data deletion or corruption. When Set Safety is on, Dbxl requires confirmation before overwriting or clearing a file. (This feature can be turned off for use in programs.) Like most Dbase products, abnormal termination of a program in Dbxl will frequently result in damaged index files, but they are easily rebuilt.

Several commands are provided to facilitate error handling within a program. On Error lets you specify a procedure to execute whenever a Dbxl error occurs, while other commands let you control the appearance of error messages. Dbxl, like Dbase and most clones, can mark records for deletion with the capability of recalling them until the file is packed.

There is no password protection and no commit or rollback functions. When an error occurs during program execution, you are given the chance to ignore the error, cancel the program, fix the program, or suspend its operation and examine the environment status for the source of problems. **Score: Good.**

SUPPORT POLICIES

Data Access offers unlimited free support on a non-toll-free line and over fax and a private electronic bulletin board. The vendor also provides extended corporate support plans and a free update if you purchase Dataflex within 90 days of the new release. **Score: Good.**

Wordtech offers one hour of free support over a non-toll-free line, private electronic bulletin board, and fax. Extended corporate support plans and a 30-day money-back guarantee also are available. **Score: Good.**

TECHNICAL SUPPORT

It took several attempts to reach technical support, but we received competent support once we got through. Data Access' personnel knew some of the answers to our questions, and looked up various possibilities in the manual. **Score: Satisfactory.**

We were able to get through immediately each time we called Wordtech. The technicians we spoke with were friendly and courteous, although not overly eager to supply the answers we needed. **Score: Satisfactory.**

VALUE

Dataflex is surrounded with such an arcane and obsolete set of development tools, that working with it sometimes feels like performing microsurgery with a stone axe.

Data Access also practices the increasingly backward custom of charging for run-time modules. At \$140 per module tacked on to the program's list price of \$695, using Dataflex becomes an expensive proposition if you want to distribute the applications you create.

Nevertheless, Dataflex has a powerful language and data engine, and there are still a few users and developers out there who don't care for all the pop-ups, pull-downs, and colorful windows. **Score: Satisfactory.**

Dbxl lists for \$249. Wordtech also sells Dbxl/LAN, which supports an unlimited number of users, for \$599; and Networker Plus, a server utility, for \$259. Wordtech sells Oracle Server front-end versions of both Dbxl (Dbxl/Oracle) and Quicksilver (Quicksilver/SQL) and a front-end version of Quicksilver for Gupta's SQL-Base database server.

It may not be as fast and glitzy as some other Dbase-compatible products like Foxpro, but Dbxl offers a surprisingly capable Dbase environment at a bargain-basement price. In addition, it's got some features that others lack, such as graphics, windows, and an interpretive environment that is compatible with a compiler from the same vendor. **Score: Very Good.**

PRODUCT SUMMARY

Database

VERSION 4.2

Company: Database International, 7 Cambridge Drive, Trumbull, CT 06611; (203) 374-8000, (800) 243-5123, fax: (203) 374-3374.

List Price: \$750, single user; \$750 for three additional users; \$1,000 for five additional users.

Requires: IBM PC, PS/2, or compatible; 640K of RAM; MS-DOS 3.1 or later; hard disk. Supports expand or extended memory.

Pros: Quick multiple applications design, easy to learn. Cons: Uneven in design; stubborn quirks; slow at complicated operations; poor error handling and technical support.

Summary: Database would live up to its name were it not for its numerous quirks and ease-of-use problems.

PRODUCT SUMMARY

Dataflex

VERSION 2.3b

Company: Data Access Corp., 14000 S.W. 119th Ave., Miami, FL 33186; (800) 451-3539, (800) 331-3960 in FL.

List Price: \$695, single-user version, \$140 per run time; \$1,200 multuser version, \$300 per run time.

Requires: IBM PC, PS/2, or compatible; 384K of RAM; MS-DOS 2.11 or later (single-user); hard disk. (Versions also available for numerous other platforms.)

Pros: Fast; powerful language; good developer's tool. Cons: Old and uneven interface; lacks many extra features commonly found in competing programs.

Summary: Dataflex is still a good choice if you need to run applications in multiple environments, but as an older product with run-time costs, it is eclipsed by more polished, less-expensive development packages.

PRODUCT SUMMARY

Dbxl

VERSION 1.3

Company: Wordtech Systems, P.O. Box 1747, Olinda, CA 94563; (415) 254-0900, (800) 728-3295, fax: (415) 254-0288.

List Price: \$249; Dbxl/LAN for unlimited number of users, \$599; Quicksilver compiler 1.3, \$599.

Requires: IBM PC, PS/2, or compatible; 512K of RAM; MS-DOS 2.0 or later; two floppy drives (hard drive recommended); capable of using up to 64K of expanded memory.

Pros: Integrated graphics and windowing capabilities; excellent programming language; companion compiler program available.

Cons: Poor screen design and reporting facilities.

Summary: Dbase-compatible interpreter Dbxl offers many more features than Dbase at a great price.

Rbase
(Continued)Smartware II
(Continued)

ERROR HANDLING

Rbase provides the SQL commands Grant and Revoke, which are used to assign data selection, updating, insertion, and deletion privileges. Rbase also supports transaction processing with rollback. Version 3.0 adds to table (or browse) mode automatic concurrency capabilities for multiuser configurations. Rbase still employs "rules" for data validation.

Rbase seemed to trap most, but not all, errors in our limited use. Some missed errors can develop into more serious problems. If you mistype your password, for example, Rbase will not stop you with an error message, but will simply assume that a password for a new user is being created. If you go on to create a table under the mistyped password, exit the program, and then type your password in correctly the next time, you won't be able to access the table you created.

We also experienced various printer-related errors. For instance, if you print a report that involves a table with restricted access, Rbase correctly provides a "no access" error message — if you print to the screen. If you send the report to the printer, it will print the error message on the printer but not on the screen.

Fortunately, the transaction processing, privilege assignments, and rule processing all help the score.

Score: Satisfactory.

SUPPORT POLICIES

Microrim offers 30 days of toll-free support for Rbase, beginning with the first telephone call. There also is support over a private electronic bulletin board and fax, and a 90-day money-back guarantee. The 3.1 update will be free to current users, Microrim said. **Score: Very Good.**

TECHNICAL SUPPORT

We got through immediately to Microrim support each time we called. The support was quick and accurate.

Score: Satisfactory.

We couldn't catch Smartware off guard in any of the error situations we created. The program is unfazed by problems such as disconnected printers.

Smartware has a "help on error" feature that allows you to enter the error number you received, for which Smartware will print the appropriate error message. In addition, the project processing manual lists system error messages and their numbers.

Smartware has a feature it calls transactions, though this is not the same as "transaction processing" in other products — it is more like a referential integrity feature that updates a related file when a master file is changed. An audit trail log is kept, a feature more in keeping with real transaction logging, but there are no rollback or roll-forward capabilities. Text files and views can be password protected, and data files can be encrypted if passwords are assigned. However, there is no means of recovering an encrypted file if a password is forgotten.

Smartware has a file-fix option available at the menu, which will rebuild a file if it is damaged. Keys can be maintained automatically, but you can rebuild them at the menu as well.

Smartware comes very close to matching the security features found in more robust competitors.

Score: Very Good.

Informix offers unlimited free support for Smartware over a non-toll-free line, private electronic bulletin board, and fax. **Score: Good.**

We got through immediately each time we called technical support. Support personnel did not put us on hold in order to research each question we asked, but we received correct answers within a few minutes each time.

Score: Satisfactory.

VALUE

Rbase and Dbase have competed for so long, it's surprising that Microrim would fall into the same trap that has given Ashton-Tate so much trouble — releasing a product before it's ready.

Though capable of much faster queries than we originally thought, Rbase 3.0 has a number of bugs and an unfinished feel. However, it probably does not have nearly the amount of serious anomalies as Dbase IV. Rbase also continues to benefit from a conceptual unit that Dbase lacks. Rbase was bumped in price from \$725 to \$795 with this version. Users of Version 2.11 can upgrade to 3.0 for \$175. The Rbase compiler (\$895) does not yet work with Version 3.0, but will eventually, according to the company. It could use some fine-tuning, but with its new interface and many new features, Rbase 3.0 has a lot to offer. **Score: Good.**

Version 1.0 catapults the Smartware II Database from its former position of "barely useful" for multiple requirements to well into the ranks of respectable relational database products. It's still not quite at the level of a stand-alone product, and it wouldn't be our preferred choice for a development tool (its interface makes it best for light applications), but Smartware handles large quantities of data admirably, better than many large-scale competitors. Such a capability cannot hurt its usefulness as part of an integrated system either.

At \$449, the new and improved Smartware, which we previously rated a poor value, makes a dramatic climb.

Score: Very Good.

PRODUCT SUMMARY

Rbase

VERSION 3.0

Company: Microrim Inc., 3925 159th Ave. N.E., Redmond, WA 98052; (206) 885-2000.

List Price: \$795; five-user Rbase 3.0 LAN pack, \$995. **Requires:** IBM PC, PS/2, or compatible; 640K of RAM with 520K of free memory; MS-DOS 3.1 or later (MS-DOS 3.0 or later for PS/2); hard drive.

Pros: Effective blend of SQL and PC-oriented relational database development environment; user-friendly menu interface; superior data entry, querying, and reporting capabilities.

Cons: Poor memory management; slow; weak error handling; bugs; overall unfinished design.

Summary: Conceptually, Version 3.0 of Rbase is a significant move forward; however, better data management and the new interface need more testing and tuning.

PRODUCT SUMMARY

Smartware II Database

VERSION 1.0

Company: Informix Software, 4100 Bohannon Drive, Menlo Park, CA 94025; (800) 331-1763.

List Price: \$449; \$599 for Smartware II Integrated packages; network node pack for one additional user, \$249; five-user pack, \$995; 12-user pack, \$1,999.

Requires: PC, PS/2, or compatible; 512K of RAM; MS-DOS 3.1 or later; hard disk (uses expanded memory).

Pros: Fast, flexible macro recording options; well-rounded for a midrange product; much improved.

Cons: Multiple steps required to perform some operations; inconsistent menu interface.

Summary: This sleeker Java with the most natural improvements, the Smartware II Database is almost as good a stand-alone database as it is an integrated component.

How We Test

Continued From Page 57

name for each customer who has an order. For consistency, all of the products in this comparison also were tested for distinct query results.

The Distinct command may slow down or speed up benchmark results, depending on how the program handles the background work to perform the command. Our tests of Dbase and Foxpro three-table queries resulted in a minor slowdown. Paradox and Rbase 2.11 were speeded up considerably overall, though not enough to change our previous speed scores. Clarion and Informix results were already "distinct."

To grade speed in this comparison, we took into consideration results from our January 8 benchmarks, awarding the highest scores to products that came closest to matching Clarion, the overall best performer. We awarded products that performed the more complex intersections the most quickly.

DOCUMENTATION:

In database documentation, a score of satisfactory requires complete and reasonably accessible and accurate information for the professional database user. We award bonus points for such extras as quick-start guides, on-line or written tutorials, on-line help, and quick reference cards; we penalize for lack of an index or table of contents or missing information.

EASE OF LEARNING:

For ease of learning, we rated satisfactory a program that can be learned by a knowledgeable database user. Clear documentation, tutorials, sample files, and other materials designed to aid the learning process are pluses.

EASE OF USE:

In ease of use, we credit features or shortcuts that make the user's or developer's life easier. In some cases, items mentioned in performance are also scored here, such as command query languages, automated report writing, application development tools, and a helpful programming environment. A product is scored within its own territory. If it is interactive, interactive ease of use is the prime consideration. If it is strictly a developer's tool, ease of development is scored. If it is both, both aspects are considered in the scoring.

ERROR HANDLING:

To rate a satisfactory score in error handling, the product must protect against casual loss of data in the event of predictable mistakes by the developer or user, and through unexpected exits from the program. We give bonuses for data recovery utilities, multilevel security (password) features, data encryption features, and extended data validation features, especially when the data validation is programmable. Products that allow you to easily bypass security or use it to sabotage the system score poorly.

Other features valued in error handling include automatic record locking (for multiuser configurations); transaction logging that allows rollbacks and/or roll-forwards; on-screen updating of modified data; and SQL security and access control features.

SUPPORT:

Support policies: Unlimited free support earns a satisfactory score. We award bonuses for product usability warranties, money-back guarantees, toll-free support lines, corporate extended support, extended support hours, and electronic bulletin board support. We subtract points for limited support periods or limited free support.

Technical support: We base our score on the quality of service we receive in the course of multiple anonymous calls to the vendor and the availability of knowledgeable technicians.

VALUE:

The products in this comparison are used as relational database systems for professional developers. Value is a trade-off among performance, features, ease of learning, ease of use, and price.

This comparison was developed by Nicholas Petrelay, Contributing Editor (author of the *Database Design*, *Rbase*, and *Smartware II* reviews) Judy Duncan, Review Board (author of the *Dist* review); Zorich Banapour and Linda Slowik, Test Center technicians; and Carla Mathews, Associate Reviews Editor.

IMPRESSIONS

On Location Is an Elegant, Fast File Finder Utility for the Macintosh

On Location for the Macintosh is a \$129 combination desk accessory and Init (start-up document) that helps you quickly locate files. This is the first offering from Mitch Kapor's On Technology company. This elegant utility beats the Apple Find File utility hands down for search speed.

To use On Location, you must first create an index for each volume that you want to search, including hard disks,

floppies, and CD ROM drives, as well as Tops or Appleshare volumes. (You can run On Location on any Mac running Tops; you cannot run On Location on an Appleshare server, but you can mount the server on your desktop and then index it.) On Location uses the index to achieve its amazing speed when searching. The time it takes to



create an index depends on the speed of your CPU and the amount of information On Location is indexing.

You can choose to index only the file names on a disk, or both the file names and the text in documents. By default, On Location indexes the text in standard types of files, such as Hypercard stacks, word process-

ing documents, and databases. You can create a custom index by excluding some types from the standard list, or including others from a comprehensive list of file types.

After the index is created, On Location automatically keeps it up to date. The Init runs in the background, watching for changes to the disk and updating the index when your computer is idle.

The moment On Location's Search window appears, it starts listing the file name, size, type, date, and path of files in the selected volume. On our 40-megabyte Mac II, On Location listed all 875 files in less than 4 seconds.

As you type in Apple's Find File, you can type in part of a file name to narrow the search. As you type, the list in the Search window changes. On Location can list all the files ending with a particular suffix in the time it takes to type it.

On Location's key feature is its capability to locate documents containing specific words. You simply type the word or words in the Search window, and the file names appear. You can have On Location match the word exactly, or you can search using a word root (known as a fuzzy search). For example, if you type "frame," On Location finds documents containing "frames," "framer," and "framing." Because it searches its index instead of the actual files, On Location is faster than Microlytics' Macintosh file finding utility, Gofer (\$79), at locating files containing specific words. Gofer, however, can search in the background, which you can't do with On Location. While they both perform fuzzy searches, Gofer can also perform Boolean searches ("or," "and," and "not") and proximity searches (e.g., look for a document containing "Ford" and "Chevrolet," but match it only if the two words are within five lines of each other). On Location can do Boolean "and" searches only.

On Location does have limitations. Due to the way it indexes words in documents (by converting them to numbers using a hashing algorithm), it sometimes finds documents that don't contain the text you looked for. In addition, it can't search by file type, file creator, or date as Gofer can. Nor can you search for words that are shorter than three characters or start with numbers.

Once you locate a file, you can display its contents in the View window. On Location comes with several Claris XTND file readers that allow the program to view text with its original fonts and styles, even if you don't have the application that created the file. If a document has one of these readers, the text appears in the View window much as it does when opened by its creating application. If there is no file reader, the results are sometimes poor. In some files, characters and words were missing; in others, paragraphs appeared in the wrong order.

In addition to viewing files, you can open or print them if the creating application is available. You can also move, copy, rename, and delete files, and create a new folder.

The viewing programs are really minor glitches in an otherwise stellar performer. On Location is an excellent tool for finding files on your Mac.

On Technology Inc., 1 Cambridge Center, Cambridge, MA 02142; (617) 225-2545.

—Kevin Susco



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FIRST LOOK ■ By MICHAEL J. MILLER

Charisma's Drawing, Editing Tools Go Beyond Basic Charting



With its new Charisma graphics package for Windows 3.0, Micrografx has delivered more than just an upgrade to its Graph Plus charting package. Charisma includes the word chart and template features that were notably lacking in the otherwise very nice Graph Plus (see product comparison, June 11, Page 63), but Charisma goes beyond that to add in many of the drawing and editing tools that have been the province of high-end illustration programs, such as Micrografx Designer.

My first impression, looking at Charisma was that it was a combination of Graph Plus and Designer, because it has both a long list of charting options and an amazing array of drawing tools. The result is a program that gives you the greatest flexibility in creating and editing charts that I've seen.

Graph Plus has always made it easy to create a wide variety of charts, including area charts, line charts, bar charts, pie charts, and data tables. This all remains pretty much the same in Charisma. In general, you create data charts by typing in the values in a worksheet associated with the chart, or by pasting or linking information from a spreadsheet. You then select the chart type and choose the basic way you want the chart to appear by

I've seen in other charting packages. Like Micrografx Designer 3.0, Charisma comes with 43 outline fonts, including 35 Bitstream and seven URW fonts, giving you a great deal of control over the various fonts and sizes. This option, which uses Bitstream's Speedo font manager, gives you a lot of fonts without taking as much disk space as bit-mapped fonts would require. Even more impressive is an option that lets you convert the text to curves, so you can then edit the actual shape of the letters. I doubt most people will want to do this, but it gives you a great deal of control over the way your chart will look.

Following in the footsteps of Lotus Freelance Plus and Software Publishing Corp.'s Harvard Graphics with Draw Partner, Charisma not only has a good selection of charting tools but also of drawing tools for annotating and editing your chart. Graph Plus had a rather nice set of drawing tools, but Charisma goes far beyond it to add almost all the graphic tools from Designer. This includes such things as tools for different kinds of curves, including Bezier curves, parabolas, circular arcs, etc. As a result, you can draw just about anything you have the talent to create. You can also bring in files from Designer and edit them, and Charisma comes with about 1,500 clip art images.

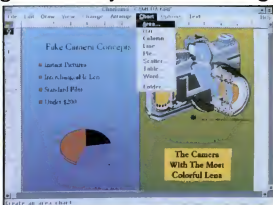
There are still a few things Designer does that Charisma lacks, such as having multiple drawing layers, a color auto-trace, and the capability to automatically dimension the things you've drawn, but these are of more interest to professional artists than those trying to create business presentations.

One nice feature is the capability to combine multiple graphs and images into the same slide or chart, which lets you do things such as import backgrounds, etc. You can even save combinations and formats as your own templates, which can be placed within multiple folders. When you choose these folders, you can see thumbnail sketches of what these files look like.

Other features I liked include the capability to create custom fills for the background, or for any part of any drawing, including the bars in a bar chart. One unusual and very nice feature is that when you import graphic files from 1-2-3 (PIC), Excel (XLC), or Harvard Graphics (CHT), the program not only brings in the chart but also puts the data behind the chart into its built-in worksheet. This gives you the advantage of retaining the chart's formatting while still being able to edit the data.

Charting packages such as Charisma are now facing some competition from a related but different class of programs—those designed to help you create complex presentations, such as Microsoft PowerPoint. Charisma has some of the features of these programs, such as templates and a screen show feature that lets you combine multiple charts, graphs, and drawings and set the time between slides or between various transitions, such as fades and wipes.

Within Charisma, you generally have a work area that is quite large—the equivalent of 12 standard-size pages or 30 screens. To create a multiple slide presentation, you would create individual slides containing a graphic for multiple pages, then take a background (which you can draw or import) and paste under each of these



Micrografx's Charisma for Windows 3.0 combines many of the fine charting tools of Graph Plus with the sophisticated drawing tools of Designer.

slides—something that's fairly easy to do using the View All Pages mode. Micrografx even intends to include templates that are set up for multiple pages. This allows you to keep a complete presentation in a single file, and to then use these pages in a slide show. A similar cut-and-paste method would allow you to create speaker's notes or handouts. All this works pretty well, but it feels like a work-around—it's not as smooth or as simple as in a desktop presentation package such as PowerPoint or Aldus Persuasion (currently available only on the Macintosh).

If Charisma doesn't shine in its presentation features, it does offer more graphic editing tools than just about any other package I've seen. Not only is it very powerful, it's also straightforward and

easy to use, and really takes advantage of the Windows 3.0 environment. If you're looking for a Windows-based charting program or any charting programs with a lot of editing tools, Charisma will be quite a contender.

The \$495 program is expected to be released in July from Micrografx, and requires Windows (3.0 recommended). Micrografx, 1303 Annapolis, Richardson, TX 75081; (800) 733-3729.

First Look examines new personal computer products before they have been through a formal review. Hear Michael J. Miller discuss other products weekly on the business Radio Network's "Computing Success," Sundays, 1 to 3 p.m. Pacific time.

clicking on sample formats in a gallery. For instance, your bar chart options include such things as stacking the bars, using the bars as percentages, and overlaying the bars. In general, you can set a 3-D perspective on any of these charts, and even change the direction and perspective of the 3-D angle. All this hasn't changed much, but it's still terrific for creating your standard business charts.

Many presentations involve a large number of word charts. Charisma now lets you create various kinds of word charts and gives you flexibility over how they work. When you design a word chart, Charisma shows you a series of templates that set a basic layout, such as the size and placement of the headline and the bullet points within the chart.

Several things make this quite easy to use: The program will automatically show you a thumbnail sketch of what each of these templates looks like, or you can click a button and get a more detailed preview of that chart, including the fonts selected. You can also edit or change these templates to include the fonts you want to use. This works quite well in helping you make the correct choice. After you choose the template, you then type text over the various placeholders. It all works very nicely, particularly for editing.

Charisma has several features that give you much greater control over fonts than

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REVIEWS

Postmaster is about as easy and basic as an electronic mail package can get, and one bonus aimed at Novell-only networks is that it runs as a TSR program in 100K of RAM, provided your computer has EMS memory. When not loaded into high memory, Postmaster requires about 55K.

Postmaster's word processing capabilities are minimal. This is a fairly trouble-free E-mail package aimed at those willing to give up some functionality for easy installation and a simple learning curve.

Scoring criteria for this review are detailed in the How We Test section of our June 4 product comparison (Page 98).

FEATURES:

Postmaster's features are basic, with a solid set of messaging features balanced by limited word processing features.

In our recent product comparison on PC and Macintosh E-mail, we found that most of the leading packages have some surprising extra features (such as CC Mail's capability to capture and attach graphics files to messages). You won't find many such extras in Postmaster — its word processor doesn't even include cut-and-paste — but it does contain most necessary send- and read-oriented features, and it comes at a low price for an unlimited number of users. (The limit is imposed only by Netware.)

PERFORMANCE:

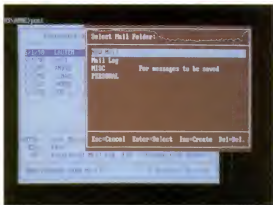
Postmaster has most of the necessary messaging features. It has capabilities to create folders, reply to messages, issue return receipts, send carbon copies, store messages, and log messages. The incoming mail notification prompt works quite well. Postmaster uses Netware's messaging function to keep an on-line notice onscreen that you have new mail. This notice stops your application until the notification is cleared, so if you are away from your desk you won't miss the announcement. Creating address lists can be accomplished with a couple of keystrokes, and using them is a menu-based, easy process. Postmaster will send a file attachment with a message, but extra file attachments have to be sent one at a time. Messaging features are very good.

Archiving consists of basic folder-based storage. The user can create, delete, and select folders to better organize mail. The message log keeps a list of messages sent as "registered," and also indicates whether a message has been read by the recipient. There is no sophisticated view of archived messages. Archiving features are good.

Postmaster's message editing features are extremely limited. Any ASCII file can be directly read by Postmaster. Word-wrap (which only works in overwrite mode) will not work at all when deleting text. There are no other features to enhance output and editing. Even a basic cut-and-paste feature is missing. Printing and processing features are poor.

There are currently no PC-to-Macintosh cross-platform capabilities available in Postmaster. We assign a score of N/A to such products. A Windows-specific version of Postmaster is in the works, according to Modern Controls.

Postmaster includes an MHS gateway, which is a significant boost to connectivity with other systems and applications.



Postmaster includes handy mail logging capabilities for storage.

Postmaster Offers Solid Set Of Messaging Capabilities

E-mail package has limited word processing features and lacks basic editing capabilities.

BY RICH BRADY, ROD CHAPIN, STEVE IRVIN, PATRICK LYONS TEST CENTER
AND SEBASTIAN RUPLEY ASSOCIATE REVIEWS EDITOR

No other gateways are offered. Gateways can cause a sense of satisfaction.

DOCUMENTATION:

Documentation consists of a user's guide and a supervisor's guide. Both of these are useful to larger, but the brief description of features. The documentation includes a table of contents and index, but considering the simplicity of the manuals, scanning the pages is just as fast as using the index. We'd like to see more complete documentation and currently rate it poor.

EASE OF ADMINISTRATION:

Postmaster is an absolute breeze to set up. Copying the software into a directory is essentially all that's needed. Postmaster uses the existing Novell bindery for configuration, so if the network is set up according to your wishes, no further installation is needed. There still will never be a need to create or update the user list or passwords — it's all done through the network. Ease of administration is excellent.

EASE OF LEARNING:

Postmaster is undoubtedly the easiest to learn of all the E-mail packages we have tested. Its menus are logical and obvious. The manual will rarely be needed to master this intuitive program. Only the overly brief documentation is a potential stumbling block. Ease of learning is very good.

EASE OF USE:

Postmaster is very logically arranged,

making it simple to use. The consistent function-key menu structure makes this program simple to operate; its designers succeeded in making it a quick-in, quick-out package. Humble TSR requirements are also a definite boost to ease of use.

The overly negative negatives in using Postmaster are the stripped-down word processing capabilities and a limit of one file attachment. As we found in our recent comparison, E-mail packages for the PC are not very advanced at text editing. But Postmaster offers easily the fewest editing extras of any package we've seen recently. Balancing Postmaster's extremely intuitive design with its text-editing stumbling blocks, we rate ease of use satisfactory.

ERROR HANDLING:

Postmaster presented no error-handling problems of note, in keeping with its simple and direct approach. We were unable to produce transmission failure problems. Error messages are basic but to the point. We rate error handling good.

SUPPORT:

Modern Controls offers free, toll-free technical support from 8:30 a.m. to 4:30 p.m. Central time, Monday through Friday. There is BBS support. Support policies are good.

We were able to get right through to support technicians. Prompt technical support was received and the technicians were very knowledgeable. Technical support is very good.

VALUE:

Postmaster is available in an ELS (eight-user) version for \$395; a version for Netware 2.x is \$495; and a version for Netware 3.x is \$995. Postmaster will support unlimited users on a network. While workstation memory constraints will restrict mail lists from holding more than 200 to 250 user names, you can still send mail to any user on a Netware LAN. The limits of Novell Netware are the limits imposed upon Postmaster when it comes to the number of users.

While Postmaster is extremely limited in word processing capabilities and needs better documentation, it's easy to become proficient with it; it requires little memory, and it includes all often-used messaging features. This is a simple and efficient E-mail package, and it's a good value. □

REPORT CARD INFO WORLD

ELECTRONIC MAIL SOFTWARE

Postmaster

VERSION 1.0

Criterion (Weighting)	Score
Performance	
Messaging features	(100) Very Good
Archiving	(50) Good
Printing/word processing	(50) Poor
Cross-platform	(100) N/A
Gateways	(100) Satisfactory
Documentation	(100) Poor
Ease of administration	(100) Excellent
Ease of learning	(75) Very Good
Ease of use	(100) Satisfactory
Error handling	(75) Good
Support	
Support policies	(25) Good
Technical support	(25) Very Good
Value	(100) Good
Final score	B+

PRODUCT SUMMARY

Company: Modern Controls Inc., 432 N. Clark Street, Chicago, IL 60610; (1-800-CONTROL).

List Price: \$395 for Novell ELS version (eight users); \$495 for Netware 2.x version; \$995 for Netware 3.x.

Requires: LAN: Novell LAN. Workstation: requires about 55K of conventional memory; message notification TSR requires 100K of EMS; DOS 3.1 or later.

Pros: Humble memory requirements; easy installation; takes advantage of pre-built user list to generate Postmaster's mail list.

Cons: Skimp on word processing features (no cut and paste); meager documentation; only one file attachment at a time.

Summary: A basic and relatively inexpensive E-mail package that requires little memory although hindered by limited word processing features and sketchy documentation.

ALSO IN THIS SECTION

Star Americana 386SX-16	73
Review Responses	74

Boosted Star Americana's Compatibility Shines

16/20-MHz system features unconventional front panel, I/O port setup.

By Victor R. Garza Test Center
And Tracy Capen
Associate Reviews Editor

As Intel struggles to get its 20-MHz 80386SX chip out the door, some vendors have jumped the high-performance gun by boosting 16-MHz chips — replacing systems' 16-MHz clock crystals with 20-MHz crystals. There has been considerable debate on whether running a CPU faster than its rated clock speed causes compatibility problems or shortens chip life. *InfoWorld* has tested several boosted CPUs in past years; most of these systems were not formally reviewed due to varying problems. To date this question still remains unresolved.

Among this small group of boosted CPU computers is Star Industries' Star Americana 386SX-16, a full-size, AT-style desktop system. The Star Americana features a unique front-panel control keypad with a digital display and a reinforced case.

In our application throughput tests, the Star Americana did, understandably, very well compared to other 16-MHz 80386SX-based computers. (See "Penny-Pinching Power," January 15, Page 57.) Its CPU-intensive time (a combination of Autocad 10, Lotus 1-2-3, Release 2.2, Lotus 1-2-3, Release 3.0, and Word Perfect 5.0) of 39 minutes and 33 seconds is the second-fastest throughput — four seconds slower than the Polywell 386SX, the only other boosted 16-MHz unit we've reviewed.

The Star Americana's disk-intensive throughput (a combination of Dbase III Plus, Version 1.1, Dbase IV, Version 1.0, and Paradox 386), was one hour, four minutes, and 34 seconds — 4% minutes faster than the previous leader, the Everex Step 386S, running at 16 MHz.

Since the Star Americana can be configured to run at the standard 16-MHz, we reran our throughput tests at the lower speed. At 16 MHz, the system took 49 minutes and 29 seconds to complete the CPU-intensive tests and just over one hour and 13 minutes to com-

plete the disk-intensive tests — still above average for all 386SX computers we've reviewed.

We tested the Star Americana's hardware and software compatibility and it performed flawlessly. We installed a Hayes 2400B internal modem, Paradise VGA video adapter, and an IBM Token Ring network adapter and found no hardware conflicts. OS/2 was not provided and not tested.

Inside the Star Americana's desktop chassis is a fairly conventional layout. The AMI system board has six 16-bit and two 8-bit slots. The system board holds up to eight 1-megabyte or 256K SIMM panels, and supports an Intel 80387SX math coprocessor. The unit's drive bays are slightly less standard. The case has openings for three half-height 3½-inch drives, plus a vertically mounted 3½-inch half-height drive. This bay held the 44-megabyte 3½-inch Core hard drive in-

el of computer, but has general descriptions for a range of Star systems. Other deficiencies include a thin troubleshooting chapter, and no index or glossary.

The Star Americana's most novel feature is its front-panel-mounted digital display — a combination sticky-keypad and small eight-digit LED. The keypad gives better security than the standard keyboard display. Pressing the Key button quickly disables the keyboard. To unlock it, a six-digit security code must be entered into the keypad. The system reset button can also be configured so a user must enter the security code before the system will reset.

In its default mode, the LED shows a digital clock or hard disk and I/O port activity. By selecting options from the keypad, the display will also show you the date, current turbo mode setting, or system speed.

The Star Americana's system board holds up to eight 1-megabyte or 256K SIMM panels, and supports an Intel 80387SX math coprocessor.

cluded with our test unit.

The Star Americana's only knock in expandability is that it lacks a case lock. On the other hand, you can disable the keyboard with the front-panel keypad.

Documentation for the Star Americana is shipped in a combination three-ring binder/plastic box, and consists of a system owner's manual, a user's guide for the Maxon video adapter, and a DOS utility package from ProMaker Ltd. called Control Panel. We found the Star's manual to be below par. Although it contains most of what you will need to set up and configure the machine, it's neither well organized nor clearly written. The manual does not focus on a specific mod-

The digital display is configured through a SETSTAR.EXE utility. SETSTAR is also used to set the interrupt and port number for the system's one parallel and two serial ports — a plus over most computers, because you don't have to open the computer's case and change switches when you reconfigure the ports. SETSTAR prevents conflicts between I/O ports, and does not allow two ports to have the same settings. The only drawback to this setup is that the serial and parallel ports will not work unless a utility, STARLOAD.EXE, is added to the system's AUTOEXEC.BAT file. This file takes the values entered with SETSTAR and configures the ports when the computer boots. This method of configuring the I/O ports also limits the Star Americana to DOS environments. It will not be suitable for Unix or network server applications that do not use an AUTOEXEC.BAT file.

Star Industries backs its 386SX with a two-year warranty. It does not provide toll-free support lines, BBS support, or money-back guarantees. We made several anonymous calls to Star's technical support and were impressed by the help we received. Star's technical support lines are open from 8 a.m. to 4:30 p.m. Mountain time.

The Star Americana's 386SX-16 has a base price of \$1,499. Adding our test configuration of 4 megabytes of RAM, a 40-megabyte hard disk, and a 16-bit VGA adapter increases the total list price to \$2,174 — the least expensive 386SX we've reviewed. Customers with the current 16/20-MHz unit may upgrade to an Intel 20-MHz 80386SX as the chip's availability increases, according to Star Industries. Although the details of the upgrade are not yet final, it will probably require an additional fee. The Star Americana offers a low price, above-average performance, and excellent compatibility (despite its boosted CPU), making it a very good value. □

REPORT CARD INFO WORLD



16/20-MHz 386SX COMPUTER

Star Americana 386SX-16

Criterion	(Weighting)	Score
Performance		
CPU-intensive applications	(100)	Excellent
Disk-intensive applications	(100)	Excellent
Fastest among 386SXs reviewed.		
Software compatibility	(150)	Very Good
No vendor-customized OS/2.		
Hardware compatibility	(125)	Excellent
Expandability	(75)	Very Good
Keyboard lock with password; no case lock.		
Documentation	(50)	Poor
Not well organized; generic descriptions.		
Setup	(100)	Good
Servicability		
System design	(50)	Very Good
Clean system board; extensive use of surface-mount components.		
Support policies	(50)	Good
Two-year warranty; technical support hours 8 a.m. to 4:30 p.m. Mountain time.		
Technical support	(75)	Very Good
Score based on our calls.		
Value	(125)	Very Good
Final score		7.8

PRODUCT SUMMARY

Company: Star Industries Inc., 7655 E. Redfield, Suite 10, Scottsdale, AZ 85260, (800) 782-7286, (602) 483-2854.
List Price: \$2,174 as configured; sold through direct sales.
Features: 16-MHz zero-wait-state 80386SX CPU, running at 20 MHz, switchable (8, 16, or 20 MHz) via software, front panel, or jumper on motherboard; two serial, one parallel port; Intel 80387SX math coprocessor support; 200-watt power supply.
Peripherals: Enhanced keyboard; Maxon 16-bit VGA board; mouse with Dr. Halo III software.
Storage and Memory: 44-megabyte Core hard disk with RAM; 1-1 controller; 1.2-megabyte 5¼-inch floppy; 4 megabytes of 80-nanosecond RAM (SIMMs, 24 megabytes maximum).
Price: Speed; front-panel keypad control.
Cons: Weak documentation.
Summary: The Star Americana ranks as one of the least expensive 386SXs. It's well constructed and does not exhibit any compatibility problems.

BENCHMARKS

16-, 20-MHz 386SX Computers

(Test times in hours:minutes:seconds)

Application	Star Americana's 386SX-16 (20 MHz)	Star Americana's 386SX-16 (16 MHz)	Polywell 386SX 386SX (20 MHz)	Everex Step 386S (16 MHz)
CPU-intensive	0:39:33	0:49:29	0:39:20	0:41:31
Disk-intensive	1:04:34	1:13:10	1:13:55	1:09:04
Autocad 10	0:07:34	0:09:23	0:07:11	0:07:21
Dbase III Plus 1.1	0:30:20	0:33:57	0:37:03	0:32:32
Dbase IV 1.0	0:17:05	0:18:14	0:18:14	0:17:07
Lotus 1-2-3, Release 2.2	0:13:07	0:18:28	0:18:46	0:14:10
Lotus 1-2-3, Release 3.0	0:16:30	0:20:49	0:17:07	0:17:38
Paradox 386	0:17:09	0:19:59	0:18:38	0:19:25
Word Perfect 5.0	0:02:22	0:02:49	0:02:17	0:02:22

*16-MHz 386SX running at 20 MHz.

*16-MHz 386SX running at 16 MHz.

*Polywell 386SX and Everex Step 386S were reviewed in our 386SX computer comparison, January 15, Page 57. Polywell is running at 20 MHz; Everex at 16 MHz.

Our applications suite of common business programs tests different aspects of system performance, including video (Autocad), spreadsheet (Lotus 1-2-3, Release 2.2), database (Dbase), word processing (Word Perfect), and 3D and 2D bit operation (Paradox). If you plan to buy a machine for a specific application, you should compare units for that, expanded. Lower numbers indicate better performance.

INFO WORLD

REVIEW RESPONSES

We'll Get Back to You

I am wondering why Tops deserves a good score for its lousy support policy. (See "Breaking Down Communications Barriers," June 4, Page 83.) The company's policy is to not route incoming calls to technicians, but rather to have technicians call you back. I am against this relatively new twist in support policies. If you thought copy-protected software was bad, wait until all the vendors answer their phones with, "Don't call us, we'll call you."

Unless you sit around all day twiddling your thumbs, technical support is bound to call you back when you're busy. That is unacceptable. If you support more than one computer user, you'll likely be unable to break away when they call back.

Let's examine what this policy implies: Their time is valuable, and yours is not. Both as a consultant and as an end-user, I'm insulted. (To Tops' credit, at least the company will tell you when it is going to call you back and is punctual about it.)

I don't recommend products from any

company with this kind of support policy, and neither should you.

Rich Wingerter
Zip Consulting and Design
Cupertino, CA

Windows 3.0 vs. Desqview

I have been using Desqview for several years, and I recently purchased a few Windows programs and have just ordered the Windows 3.0 upgrade for my new AST 386 computer with 2 megabytes of memory. I plan to buy several more Windows programs, but I also plan to continue using several non-Windows programs, in particular Dbase, R & R Report

Writer, and Word Perfect 5.1.

I would be very interested in seeing an exhaustive InfoWorld comparison of Desqview and Windows for mixed use, that is, multitasking with a mixture of Windows and non-Windows programs. It is more efficient to run Windows programs in Desqview windows, as Quarterdeck claims (and which I have not yet been able to get to work very well). Or should one run the non-Windows programs under Windows, as Microsoft advises?

Since getting either of these mixed environments to work would be a time-consuming business, what with memory conflicts (I have been seeing all too much of QEMM error No. 13 lately) and unpredictable interprogram interactions (for example, Brief won't run from its Video Dimensions batch file via Norton Commander's extension file after loading Mace Vaccine), I would like to see your staff of testers struggle with this mess and come up with some well-based recommendations on the best course of action for people who want relatively trouble-free multitasking combining Windows and non-Windows programs.

Helen Bell Feddema
Kerhonkson, NY

We intend to publish this fall a product comparison of multitasking operating systems, chosen from among Windows 3.0, OS/2 1.3 (with Presentation Manager), Desqview 386, and Macintosh System 6.04. We will benchmark each environment while running its leading applications (for example, spreadsheet, word processor, desktop publishing package, etc.) in order to determine the relative merits of each operating system. Our testing should address several of your concerns. The evaluation does not yet have a specific date. — Editors

Corrections

In our review of the IBM LaserPrinter E (June 11, Page 91) we erroneously displayed the photo of the IBM Personal Page Printer II, instead of the IBM LaserPrinter E. (See correct photo below.)



The IBM LaserPrinter E

In our June 11 product comparison of charting software (see "Making Your Point with Style," Page 63), Draw Perfect's support policy score was incorrectly listed in the report card. The actual score, as described in the text, is very good. The final score is unchanged.

InfoWorld welcomes comments about its reviews. Letters are subject to editing for space and clarity. Please address correspondence to the Reviews Editor, InfoWorld, 1050 Marsh Road, Suite C-200, Menlo Park, CA 94025.

Hard Disks Die.

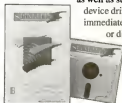
Hard disk manufacturers want us to believe that hard disk technology is absolutely reliable ... but experience teaches otherwise. We depend upon data storage to be flawless, but hard disk technology isn't. Surface defects, head alignment drift, and low-level format aging cause hard disks to fail.

A hard disk drive's low-level format fades with use. The drive's read/write heads lose their delicate alignment and move away from the original low-level format information. These new data track locations intersect unseen surface defects that were once harmlessly located between tracks. DOS's chilling "Abort, Retry, or Fail?" message inevitably results. Precious data is soon lost.

If left unchecked, data storage becomes more an act of hope and faith than one of science.

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SpinRite won Byte Magazine's prestigious Award of Distinction and continues to win computer industry praise and acclaim. It has proven itself to be effective in preventing hard disk failure. SpinRite will work for you.

SpinRite II features a detailed technical log, as well as support for DOS 4 and large device driver partitions. It is available immediately from local software retailers or directly from Gibson Research with a 30-day satisfaction guarantee.

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To receive additional literature or to purchase SpinRite II, call toll-free:

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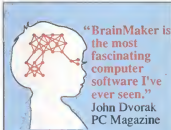
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SAMSUNG'S POWERFUL NETWORK FILESERVER

Co-designed by Novell, Samsung's 33 MHz Model 386A3 fileserver is designed for compatibility with Novell's Netware and supports all major network topologies. The system has 4MB of main memory, 64KB of cache, and Novell's disk coprocessor/floppy controller board which supports two floppy drives and seven hard drives.

Other features include eight expansion slots, a 1.2MB 5.25" floppy disk drive, MLT-II video adapter, one parallel and two serial ports, two full-height drive bays and a 375-watt power supply. The system operates at either 33MHz or 8MHz (keyboard selectable), zero wait state.

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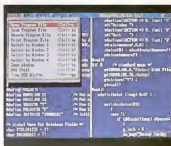
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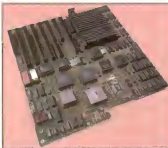
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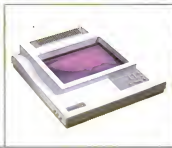


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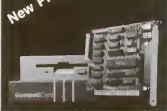
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Upgrade

Continued From Page 1

Comdex earlier this month. "There is absolutely no consistency," Lotus does upgrades one way, Microsoft another. The upgrade policies even change from release to release within a given vendor's product line," she said.

The number of different ways vendors handle upgrades can be bewildering.

Some insist that corporations undergo a full upgrade, others require that all existing copies of an application be returned to the manufacturer before the upgrade is issued; still others will only upgrade the latest version of the software. "Skipping" a minor upgrade could cost a company the ability to evolve users when a significant upgrade comes along.

Koch remembers the difficulties in upgrading her users from Lotus 1-2-3, Version 2.2 to Version 3.0.

"I received a letter from Lotus [saying] that I was entitled to some free upgrades, but I needed to 'apply' for them," she said. "I had to find the exact users who were to get the free upgrades. I ended up guessing."

Even though her staff had the proper invoices, they couldn't figure out how to find the right department, organization, and geographic location of the people entitled to the free upgrades, Koch said.

PC managers say that they need another category for comparing applications—one that covers their management duties.

Software must compete on 'ease of handling,'" said Coca Cola's Currid. "It's so hard to buy 1-2-3 on a LAN that we might not; we might actually buy another product as a result."

Some upgrade procedures are designed with individual users in mind, frustrating corporate systems managers tremendously, said Alex Kasik, PC manager for Ernst & Young, in New York.

"Using an 'install' program might be better for the inexperienced user, but for people like me, it's very inconvenient," Kasik said.

"We decided to put a large group of users on Windows and Windows Word, and it's not a simple task," said Ryder's Kasik, who manages more than 1,500 PCs scattered at corporate sites throughout the country. "Once you get it up and running, it's reasonably easy to manage, but it's difficult to eliminate the old applications and get the new applications installed."

Other packages are difficult to manage, even though they are easy to use. "About two years ago, we installed an EIS [executive information system] that was great for the executives—it had a 'crash' screen, and they said, 'Just point at the report and look at what they wanted, but it was a bear to keep that thing up and running,'" Koch said. "It took a significant number of our staff to manage that one piece of software." □

IBM

Continued From Page 1

"It can run popular applications like Excel in 2 megabytes, and something like LAN Requester in 3 or 4 [megabytes]," Reiswig said.

Microsoft officials also indicated they may not release a similar version of OS/2 for its OEMs, instead preferring to continue with OS/2 2.0 for the 80386 processor.

"We're not convinced the improvements make a new release," said Paul Maritz, vice president of advanced operating systems for Microsoft.

"Version 1.X for 80286-based machines" has a limited life span in that it doesn't make sense to put major features into the 286 platform," Maritz said. However, an IBM spokeswoman said the release is not restricted to the 286 platform and will work with 386 systems as well.

Maritz indicated there is a "difference of opinion" between Microsoft and IBM as to the importance of the unreleased version of OS/2 that IBM showed at its booth at PC Expo.

Given a choice between an improved Version 1.X and OS/2 2.0, Maritz said most users would prefer the latter.

IBM was able to slim down OS/2's memory requirements by making its print spooler more swappable to disk. IBM also improved switching between DOS and OS/2 applications and improved the speed in the program's application loader. The

program takes up about 10 megabytes of disk space, although that is an improvement over the 14 or so taken up by previous versions.

"That extra 4 megabytes is enough space for users to add another application," an IBM spokesman said.

Although almost 50 software developers showing off OS/2 applications at PC Expo, only Lotus Development Corp., with 1-2-3/G, and Word Perfect Corp., with its word processor, demonstrated their products under the unreleased version of OS/2.

Some observers don't think the more svelte OS/2 will change the minds of users leaning toward Windows or waiting for OS/2 2.0, now expected out sometime next year.

Don't think it will gather too much momentum. "I think all the Windows [3.0] applications coming soon will take care of that," said Tim Bajarin, vice president with Creative Strategies Inc., in Santa Clara, California. "I think it is good, though, for the look and feel of OS/2."

IBM refused to say when it would release the product. However, IBM representatives said the company would not do so until it could thoroughly resolve other key performance issues.

IBM also showed off, for a second time, its unreleased PS/2 Super Server, this time configured as a 33-MHz 80486-based system. During the demonstration, IBM had the Super Server booked to several client machines networking full-motion video. The Server was configured with Aox Corp.'s 486 Micromaster bus-master card, a LAN bus-master adapter, a SCSI adapter, and a 320-megabyte hard disk.

IBM said the Super Server was capable of compressing and decompressing data at 30 frames per second on the fly. This was the first time full-motion video capabilities have been networked, according to IBM.

Like the other technology demonstrations in IBM's booth, the company refused to say when the Super Server would be released. Robert Carberry, IBM's vice president of systems strategy, said the system would be in beta throughout the summer and into the fall.

Microsoft

Continued From Page 1

user interface, includes more profit-driven than OS/2 1.1, and fixes problems with the print spooler found in earlier versions.

LAN Manager 2.0, with a 32-bit version of the HPFS and support for limited multiprocessing and the Microsoft/DCA Comm Server product, is also expected to be available to end-

users this summer, according to Maritz. The jointly developed Comm Server will let multiple DOS and OS/2 users access IBM SAN services and Advanced Program-to-Program Communication, as well as systems, terminal emulation and file transfer. SQL Server 1.1—a minor upgrade to the Microsoft/Sybase SQL database product—is also set to ship this summer.

Microsoft officials would not confirm actual dates for the releases, industry insiders

said the company will probably hold a gala to announce release dates for the networking products in late July or early August.

"I believe something along those lines is being planned," Maritz said.

Maritz also confirmed that Microsoft now plans an early 1991 release for OS/2 2.0. Initially, the 32-bit version of the next-generation operating system was scheduled to ship by the end of 1990.

Laure Flynn and Margie Wright contributed to this report.

Servers

Continued From Page 1

Network may not gain any advantage from multiprocessing, and multiprocessing versions of those packages may not arrive in the foreseeable future. Micro-Net's LAN Manager for OS/2 derives some advantages from multiprocessing, and is expected late this summer.

The center of attention in multiprocessing hardware is Compaq's dual-processor Systempro, which is now shipping in dual-386 form, but is ship with multiprocessing software until December. ALR, Zenith, and Mitac are all shipping multiprocessing systems that use up to six Intel processors, and these are all currently functional using software shipped by the Santa Cruz Operation last week.

No one outside the Unix community expects multiprocessing to speed up the traditional LAN file and print man-

agement functions, but it may keep them from running considerably slower when the server is simultaneously used to support client-server applications such as Oracle's database server and other communications services.

Although it was rumored at the Systeprio introduction that Novell would functionally partition its Network Server software, allocating some functions to one Systeprio processor and some to the other, Novell has since backed off from its commitment to short-term development of a multiprocessing version of Netware 386, according to one Novell employee who requested anonymity.

"The way that Netware is designed, we don't see a need for multiprocessing. All that [it] can accomplish, we can do in other ways," he said. Support of multiple processors in Netware 386 Level 3 may force those changes, but not until mid-1991.

Banyan will ship its multiprocessing version for the Compaq Systeprio in August, according to Barry Burke, Banyan's executive director of product marketing.

"Our intent is to have it run on other symmetric multiprocessing platforms, but right now it's only for the Systeprio, which does memory manage-

ment in a slightly different way from the other multiprocessors," Burke said. He sees advantages in multiprocessing for Vines, because the underlying Unix software is capable of spanning out different processes, such as TCP/IP, X.25, SNA terminal emulation, asynchronous terminal emulation, and bisynchronous communications to separate processors from those support file and print functions.

Microsoft LAN Manager 2.0 for OS/2, which was expected to ship in July, will be out this summer, said Paul Maritz. Microsoft's vice president for advanced operating systems, LAN Manager 2.0 will be limited to two processors, one of which off-loads the network I/O subsystem, including the HPFS/386 and transport protocols, from the main processor. The server's main processor runs LAN Manager and OS/2, plus such applications as SQL Server or E-mail.

SCO Unix now benefits from a second Systeprio CPU, but its LAN file and print service do not, cautions Gary Stimak, senior vice president of engineering at Compaq Corp.

"Expect database and communications modules to take advantage of the Systeprio multiprocessor support this fall," he said. □



IBM's PC Expo "technology demonstrations" will eventually result in shipping products.

Ventura

Continued From Page 1

Using Windows provides extended memory support for larger documents, automatic text cursor and mouse scrolling, and support of the Windows Clipboard for dynamic linking of other programs running under Windows.

The Windows version can also copy tags from one chapter to another, which Galdos said is not possible under GEM.

Interface changes due to the use of Windows drop-down

menus will be carried over to the OS/2 product when it ships later in the third quarter. Galdos said. The GEM interface in the DOS version of the Gold Series is expected to be unchanged from Ventura 2.0.

All three versions of the Gold Series incorporate Ventura Professional Extension and Network Server capabilities, and all are upwardly compatible with Ventura 2.0. All three Gold Series versions list for \$895.

As reported earlier (see May 28, Page 16), Xerox said it will release Ventura Publisher for the Mac late in the third quarter.

GSA: QUINDLEN AND ALSOP • BY STEWART ALSOP

Why Purchase a Home Computer When You Can Take Home a PC?

Is there a market for a home computer?

This has to be one of the all-time most interesting questions in the PC industry, based on the number of times companies have tried to answer it. And it is probably the question more companies have tried to answer less successfully than any other.

There are clearly markets for powerful, or expensive, or laptop, or portable, or graphical, or cheap computers. But home computers?

The truth is that every single computer that has been designed specifically for home use has failed: the TI 99/4A, the Coleco Adam, the Times/Sinclair 1000, and the IBM PCjr being notable examples of the genre.

But — and this is not a contradiction — there have indeed been several successful home computers, specifically the Commodore 64, the Apple II, the Tandy Model 1000, and the IBM Model 30. Collectively, these computers have sold millions of units: The C-64 sold more than 8 million units, and the Apple II has sold more than 6 million. These are serious numbers, and spell out the reason PC makers are drawn to produce a "home computer" like bees to honey.

But every one of these computers has something in common: They were not specifically designed for the home.

Why? In the early days of the PC boom, there wasn't enough demand to think in terms of home, business, or education alone; PCs were designed for individuals to use (as opposed to min-



frames and minis, which were designed for groups of people to use). So there were business and educational applications developed for the C-64; as a result, it had market share, albeit small, in both businesses and schools. Nor was the Apple II designed as a school computer. The first truly successful program for the Apple II was Visicalc, which made the Apple II a business machine well before it started selling in the schools.

The Tandy Model 1000 was designed to use the best features of the PCjr (particularly the special graphics mode and the three-voice sound chip) in a general-purpose computer with standard connectors and expansion ports that would appeal to several different markets.

The point is that, so far, the only way for manufacturers to be successful in the home computer market is to ignore it. Remember when John Sculley was quoted in 1984 as saying that there was no market for home computers? He was ex-coriasted for condemning a marketplace that represented the majority of Apple's revenues — at the time Apple was selling millions of IIs and IIs to people who were using the machines at home.

But he was observing the same phenomenon I have tried to describe: Computers designed specifically for home use don't seem to appeal to customers. And the Apple II had never been designed as a home computer.

What's interesting is that we're all customers or potential customers for computers at home, despite the fact that we all use computers aggressively at work. So it shouldn't be too difficult to understand this phenomenon. The problem is that once we decide we want to use a computer at home, we have many reasons for wanting it, and we have too many potential ways to justify buying it, since our personal economic system is different than our business economic system. We also have to satisfy the interests of whoever lives with us — spouse, roommates, children, relatives, etc.

It is precisely this aspect of using computers at home that keeps tripping up the manufacturers. Businesses can justify spending thousands of dollars on a computer for a single application — word pro-

cessing, spreadsheets, database, or desktop publishing. And many computers in business are still used exclusively for one application.

But individuals spending their own money cannot assign enough value to one application to justify the purchase of a \$1,500 to \$3,000 machine. So the only way for people to justify such an expense is to buy a multifunction device and find enough applications for it that the collective use of the applications justifies the expenditure.

In other words, if the computer costs \$2,000, then the typical "home buyer" justifies buying it by assigning some value to doing work at home, some to running educational software for the young kids, some to the older kids doing homework, some to the larger house, some to the expenses sorted out, and some to the time everybody spends playing games on it.

And there you have the key to the home computer business: If you design a computer for just "home use," you restrict the idea of what that computer can do in potential customers' minds and doom it to failure. But, if you design a general-purpose computer that can be made at a price that individuals can afford and make it good enough for them to justify it in many different ways, then just watch what happens.

Stewart Alsop is the editor of PC Letter. He alternates each week in writing this column with Ruthann Quindlen, vice president at Alex Brown & Sons.

NOTES FROM THE FIELD • BY ROBERT X. CRINGELE

Dbase IV 1.1 Opens on July 9, Probably for a Limited Engagement

For once, we arrived early for a trade show. Juggling airline schedules and special hotel rates, Pammy had calculated that we could get the best deal on our trip to PC Expo by going out the weekend before, then staying until either the first snowfall or until we run out of Broadway shows to see.

And she was right. We were encoined in the Grand Hyatt days ahead of time. The Donald's money troubles had not affected service, and they'd even added RJ-11 jacks to the phones. It was Saturday night, we had tickets for City of Angels, and all was right with the world.

Then the phone rang.

DISCOUNT RETRACTION. So who do you think it was on the phone? Nelson Mandela? George Bush? Dr. Ruth? How many guesses it was K-Mart?

K-Mart? Yes, deep from within the Blue Light empire came word that the discount giant has no intention of buying IBM RS/6000s as reported here last week. Instead, they are replacing old RTs with new Model 80s, with not a word about software compatibility.

So maybe we'll spend the rest of the column on other equipment K-Mart isn't bought. Include on that list, at least for now, the 586 System running in Compag's network lab, back in Houston. According to blabby Compag sales types in their PC Expo booth, this prototype ran in 9 minutes a Unix application that took "hours" on a System 386/33.



We're talking '91 at the earliest.

AND NOW, WORKABLEWARE! "Bobby, come on," Pammy called. "We'll be late."

Pammy was so excited about seeing this play, all she could focus on was the time and hanging onto the tickets.

"So did you know that Dbase IV 1.1 will finally be released on July 9th?" I asked as we waited for the elevator.

"Uh-huh."

"But while Ashton-Tate says the code is 'stable' and 'workable,' they are making no claims that it's bug-free. We're probably see another version appear by the A-T developers' conference in September."

"Uh-huh."

"And did you know that I have plans to tell you into white slavery at the end of the evening?"

"Sure, Bobby. What's wrong with this elevator, anyway?"

WIN 3 USERS PIF-D-OFF. We weren't the only early arrivals for PC Expo. Waiting in line for a taxi in front of the hotel, we found ourselves in a crowd of Win 3 users.

Those who upgraded from Win 2.11 to Win 3.0 were complaining that the installation program does not automatically replace their printer drivers with new ones, hence printing is screwed up. Even more damning, 3.0 does not recognize PIF files as executable apps. It also applies spurious icons to PIF files, identifying Quicken on one user's system as Quattro Pro. The answer to this PIF problem is to manually edit the `SYSTEM` file and tell it that PIF files are a valid Windows file type. Of course, how many users are going to know how to do that edit?

And Page 5 of `NETWORK.TXT` on the Win 3 disks includes a section on how to format floppy disks on diskless workstations. It even tells you which floppy drive on the diskless PC to designate for the format.

But the best story of all comes from users of TIC EXE, from Bogus Software — a Win 2.11 application that puts a Mickey Mouse icon on-screen. Optionally, Mickey can be changed into a caricature of Bill Gates. Know up front that I have not tested this, but the crowd on the curb claimed that tic won't run under Win 3, and it also won't run under Win 2.11 after you've tried to install 3.0. The code is

trashed, which is both wonderful revenge for the lampooning of Mr. Bill and potentially illegal if it is intentional.

FRENCH MISCONNECTION. In another item with legal implications, there is a freeware utility floating around called LZE. Written by a 17-year-old French teenager, LZE pulls empty space out of EXE and COM files, and changes COM files to EXE. Typical space savings is 30 to 45 percent, and execution speeds can nearly double, because the smaller files are still executable. Dbase III Plus screams after it has been LZE'd.

What a great product, right? Well, it was offered to nearly every major PC software vendor, all of whom could have saved millions of disks and bucks by using it, but turned it down, many because they couldn't read French. So the jaded adolescent made the product freeware, but copyrighted it, which means that anybody can use LZE but nobody can sell it.

By this time, we had arrived at the Virginia Theater.

The usual disaster, our tickets were for the night before. Emotions ran high. Movers, movers, movers were needed. And the play was terrific!

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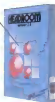
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